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ABSTRACT

This document consists of one volume year (four quarterly issues) of the journal "HyperNexus," containing articles on hypermedia and multimedia use in education. Article topics include using hypermedia to teach telecommunications; Turtle View--a 3D geometry program; helping students design World Wide Web documents; highlights of the National Educational Computing Conference (NECC) 1996; software and book reviews; developing interactive, dynamic courseware; working in a hypertext environment; feedback in multimedia HyperStudio stacks; intranet use in the learning environment; hypertext passages with students who exhibit reading difficulties; simulation in web-based environments; MidLink Magazine--for children in the middle grades; an electronic journal focused on computers across the curriculum; and music education resource links. Columns include editorials, messages from the Chair of the SIGHyper Board of Directors, and "Exemplary Web Sites." Issue number 4 includes an index to "HyperNexus" volume 7, numbers 1-4. (SWC)

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# HyperNexus: Journal of Hypermedia and Multimedia Studies

Volume 7 Nos. 1-4
October 1996- June 1997

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A Special Interest Group Publication of the International Society for Technology in Education

# HyperNexus

## Journal of Hypermedia and Multimedia Studies

Volume 7 Number 1 October 1996

INTERNATIONAL SOCIETY FOR TECHNOLOGY IN EDUCATION
ISTE

**In This Issue:**

Meet the 1996–1997 SIGHyper Board of Directors

SuperCard, HyperCard 2.3, and the World Wide Web

3

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# HyperNexus Volume 7 Number 1

**Publisher**

International Society for Technology in Education

**Editor-In-Chief**

Gertrude (Trudy) W. Abramson, EdD
School of Computer and Information Sciences
Nova Southeastern University
954/423-1211
abramson@scis.nova.edu

**Contributing Editors**

George K. Fornshell, PhD
School of Computer and Information Sciences
Nova Southeastern University
gforn@scis.nova.edu

Marlyn Kemper Littman, PhD
School of Computer and Information Sciences
Nova Southeastern University
marlyn@scis.nova.edu

Paola Williams
Punahou School
Honolulu, HI
pwilliam@lava.net

**Publications Coordinator**

Jennifer Roland, ISTE

**SIG Coordinator**

Dave Moursund

**SIGHyper Board of Directors 1996–1997**

Paola Williams, *Chair*
*pwilliam@lava.net*

George Fornshell
*gforn@scis.nova.edu*
*954/476-8945*

Mark Horney
*mhorney@oregon.uoregon.edu*

Caroline McCullen
*caroline_mccullen@ncsu.edu*

Susan Veccia
*svec@loc.gov*
*202/707-6151*

Trudy Abramson, *Editor-in-Chief*
*abramson@scis.nova.edu*
*954/423-1211*

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# ■ The Editor's Pulpit

*Trudy Abramson*

## Expanding Horizons

### Welcome to Volume 7

This volume covers the academic year 1996–1997. Six years have gone by since *HyperNexus* began under the editorship of Annette Lamb, who carried it solo for its first four years. I came aboard for the 1994–1995 publication year and became Editor-in-Chief with volume 6. We are pleased that our current paid readership includes more than 1,000 advocates of hypermedia and multimedia.

Many years ago, a third-grade pupil explained to me that he was very good at writing reading (stuff for others to read) but not quite as good at reading writing (stuff that others had written, for example, readers and workbooks). This was an astute self-assessment from a young man who could put his thoughts on paper in the most remarkable way. Sometimes I get the feeling that our readers are the other side of that coin. They have very positive attitudes toward reading *HyperNexus* but are reticent about contributing to the SIG effort. To that end, the SIG board voted at the 1996 National Educational Computing Conference (NECC) to sponsor a contest with cash awards, publication in *HyperNexus*, and participation in a Society Session at NECC '97 in Seattle. Details will appear in volume 7 number 2.

### SIGHyper Board 1996–1997

The bylaws of ISTE's special interest groups call for annual election meetings at NECC each June. A call for nominations for the SIGHyper board was announced by SIG chair, Paola Williams in volume 6 number 3. The new board members are:

- Paola Williams; SIGHyper Chair; pwilliam@lava.net.
- George Fornshell; gforn@scis.nova.edu; 954/476-8945.
- Mark Horney; mhorney@oregon.uoregon.edu.
- Caroline McCullen; caroline_mccullen@ncsu.edu.
- Susan Veccia; svec@loc.gov; 202/707-6151.
- Trudy Abramson, *HyperNexus* Editor-in-Chief; abramson@scis.nova.edu; 954/423-1211.

NECC conferences typically attract about 4,000 people. SIG meetings are formal times set aside to speak with and see the people whose work we read and with whom we communicate electronically all year. By joining a SIG, you begin with a group of people with whom you have working interests in common. By becoming active in the SIG, you gain professional friendships that create a base for enjoying the conference and maximizing your investment. We are planning several SIGHyper session for the '97 meeting; suggestions are solicited from all members. [Part of the hyper seems to be that we are sometimes HyperSIG and at others, SIGHyper.]

### Meet the Board

Paola Williams has once again been unanimously elected SIGHyper chair. Paola (pronounced Powla) is a computer education/social studies teacher at Punahou School, Honolulu, Hawaii. She serves on the boards of the Association for Interactive Multimedia Hawaii (Aim Hi) and the Hawaii Network for Education in Science (Hi Nest) and is a frequent presenter at conferences and workshops. Appointed by the Governor of Hawaii to the Hawaii State Goals 2000 Panel, she works with the panel's support group for technology planning. Paola is very involved in school reform; she focuses mainly on the roles of technology in restructuring education.

George Fornshell, who joined *HyperNexus* as consulting editor in volume 6, is a newly elected board member. George is an associate professor of Computing Technologies in Education at the School of Computer and Information Sciences, Nova Southeastern University. His primary research involves applications of new multimedia hardware, software, and telecommunications products and their uses in on-site and remote teaching, learning, and training.

Mark Horney is the SIGHyper historian. Mark is the board member who has served the longest; he has been involved with SIGHyper since its inception in 1990. At that time, he was ISTE's SIG Coordinator. Mark is currently at the Center for Electronic Study at the University of Oregon. We look forward to more (current or historical) news from Mark about both the SIG and himself.

Caroline McCullen, a new board member, teaches electronic publishing at Ligon GT Magnet School in Raleigh, North Carolina, the site of *MidLink Magazine*, the award-winning Web page for kids in the middle grades. Caroline is Technology and Learning's 1996 National Teacher of the Year. She credits this honor to the way students respond to the interactive nature of the Web.

> Who wouldn't be fascinated by the most extensive library in the world? Using current technological tools—the Web, the Internet, and multimedia—teachers can find success with students in ways never before possible. What an exciting time to be in the classroom!

We hope to feature MidLink Magazine in a future issue. Until then, access it at

http://longwood.cs.ucf.edu/~MidLink

The following is a statement from Caroline that we hope will stimulate reader contribution.

> I believe the Web can facilitate learning across the curriculum, especially when the work is driven by the students' real interests and learning styles. Multimedia projects can tap some fact of almost everyone's individual style. If you believe Howard Gardiner's theory of multiple intelligences, you probably agree that the World Wide Web and multimedia satisfy a myriad of the needs of today's complex learner.

Susan Veccia, another new board member, is the founding editor of *Multimedia Schools* magazine, a practical journal dedicated to sharing useful ideas about using new technologies in K–12 schools. She spends a great deal of time online communicating with teachers and school media specialists about their projects. Susan invites SIG members to check out the magazine's Web site at

http://www.onlineinc.com/mmschools

to get a sense of the flavor of the publication. Another part of her world involves the Library of Congress, where she has worked since 1981 as a part-time educational resource specialist for the National Digital Library Program. This is a massive undertaking to digitize one million items for the Library's American archival collection by the year 2,000. She has been coming up with strategies about how to present and package these materials for the K–12 audience. This nationwide effort may be accessed at

http://www.loc.gov.

Susan is a professional librarian who has worked in a public library system and in a school media center long before the word "multimedia" was conceived. Last year, she served as a judge for the Software Publishers Association Codies Award and will do so again this year.

Trudy Abramson, Editor-in-Chief, introduced herself at some length in Volume 5 number 1/2. Trudy continues as a professor of Computing Technologies in Education, School of Computer and Information Sciences, Nova Southeastern University, where she works with doctoral students in authoring languages and courseware design and development. Her current research involves the impact that Internet and Intranet hypermedia and multimedia documents will have on teaching, learning, and training.

## In this Issue

**Paola Williams** writes a memoir-type reflection about NECC. It is easy to catch her enthusiasm. Start planning now to join us at NECC '97. Remember, school budgets run out of support funds as the school year draws to an end, so now is the time to plan to attend.

**Karen Ivers** describes the use of a computer-based, hypermedia tutorial/simulation in an undergraduate education class that teaches students telecommunications basics and online telecommunications skills. The simulation was created in HyperCard 2.3.

**Michael Laszlo** uses SuperCard and its scripting language SuperTalk to develop TurtleView, a program that realizes turtle geometry in a 3D virtual world. This article should be of particular interest to teachers who are searching for ways to have students explore some of the techniques used to produce virtual reality.

**Elizabeth Boling** and **Sonny Kirkley** continue their tutorial on helping students design World Wide Web pages. (Part 1 appeared in volume 6 number 4 of *HyperNexus*.) This article addresses the design of Web documents or pages and includes tips on making an existing Web site easy to maintain.

**Trudy Abramson**, ever-optimistic about getting reader participation, opens a forum on transitions from paper to electronic media a la Marshall McLuhan. This is a personal opinion; opposing perceptions will be published.

**Linn Boswell** (Silent Wolf), Webmaster par excellence and role model to many aspiring teacher Webmasters, presents the Eagle Ridge (Arizona) Elementary School Web Site. Each underlined word or phrase is a link to another Web site. To get the full flavor of a site, it is necessary to access it with a Web server. HyperNexus is publishing this work as a carrot: No one can resist getting online after seeing all the "goodies" Eagle Ridge has to offer.

**Bryce Bernard** reviews MayaQuest—The Mystery Trail, a CD-ROM simulation developed by MECC in 1995 that may be used with a World Wide Web site sponsored by the producers. He is very enthusiastic about this program's usefulness as a learning tool.

The issue ends with a much-circulated, lengthy, tongue-in-cheek article about a new technology called "book." We were unable to find the original authors.

## Letters

Once again, we are going to press with no letters to publish. Conventional wisdom from the ISTE office tells us that teachers are recovering from the long school year. We hope that subsequent issues will reflect increased reader participation.

*Trudy Abramson, Nova Southeastern University, School of Computer and Information Sciences, 3100 Southwest 9th Avenue, Fort Lauderdale, FL 33315; 954/423-1211; abramson@scis.nova.edu*

**http://isteonline.uoregon.edu**

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# ■ From the Chair

*Paola Williams*

## Welcome to the New Volume

Summer is always a time to kick back and reflect on the past and prepare for the future, particularly for teachers. Most of us take time to relax and do something different. There are, however, many of us that use this time to learn something new about our profession or increase our skills in new areas. The 1996 National Educational Computing Conference (NECC) was a perfect opportunity for beginners in technology and old timers (both in age and use of technology!) to mix and exchange ideas about the use of technology tools in out classrooms, colleges, and workplaces.

Perhaps the most invigorating part of NECC '96 was the location. Because I had never been to Minnesota (remember, I'm from Hawaii), I was thoroughly captivated by the beautiful twin cities of Minneapolis and St. Paul. Minneapolis is the model for any city council or planning group that wants to bring new life to its metropolitan area: Its convention center is both beautiful and functional, and hotels, wonderful restaurants, and quaint stores and shops are located within walking distance of the convention center. Minneapolis is open to the visitor.

NECC '96 was hosted by Technology and Information Educational Services (TIES). Their goal was to host a conference that provided opportunities for both professional and personal growth. It was clear by observing the attendees that they met this objective. With more than 300 concurrent sessions, in-depth preconference workshops, keynote address, meetings, and events sponsored by other participating organizations (e.g., ISTE), there were unlimited opportunities to network with colleagues and experts.

From the opening reception, "Flavors of Minnesota," through the three days of sessions, and even at the "Get-Together Hosted by Apple Computer," every event offered a unique opportunity to the attendee. For example, people with Internet access and telnet capability (the ability to access their accounts from a remote location) were able to check their e-mail and send mail to anyone, anywhere, as if they had never left home. This service was generously provided by the staff at Apple Computers, who set up a bank of computers in the conference center. A highlight for presenters was the assistance available from TIES staff, who provided expert assistance with a smile. This was an invaluable service for presenters, who travel great distances with their disks and drives and hope that their presentation will work on a different computer with different versions of the software. TIES staff provided just what every presenter needed. Thanks, TIES!

In addition to all of the wonderful presentations, there were simultaneous meetings and loons-of-a-feather sessions. SIGHyper held a lunch meeting where new board members were announced and directions were given for the coming year. We are pleased to announce the three new board members who were profiled in "The Editor's Pulpit." Our commitment to *HyperNexus* has prompted the board to look at the future of electronic publishing, both for the journal and for information about SIGHyper. We are continuing to have a presence at NECC and Tel•Ed and encourage as many of you as possible to support ISTE's presence at conferences for educators who use technology in school. SIGHyper is planning to announce a contest for outstanding projects using multimedia and hypermedia in the classroom that are designed and implemented by teachers. Prizes will be awarded at NECC '97 in Seattle, Washington. Look for announcements in upcoming issues.

I look forward to the upcoming year as SIGHyper's Chair. I think we are on the brink of major innovations in the ways in which we communicate with each other and our students. The SIGHyper Board hopes you will continue your support of our SIG in addition to informing your colleagues about us and joining our efforts to make effective use of multimedia in your classrooms.

Aloha,

***Paola Williams**, SIGHyper Chair, Punahou School, Honolulu, HI 96825; pwilliam@lava.net*

# Using Hypermedia to Teach Telecommunications

*Karen S. Ivers*

One of the requirements for a Multiple Subject (Elementary) Clear Teaching Credential in the state of California is a computer course. During this course, teachers learn how to use the computer as a tool, evaluate educational software, and create lesson plans that integrate technology throughout the curriculum. Several of the topics included in the Department of Elementary and Bilingual Education's Clear Credential computer course at California State University, Fullerton (CSUF), are multimedia, hypermedia, and telecommunications. Students are provided with as much hands-on instruction as possible, and instructors are encouraged to model the use of technology as a teaching/learning tool. One way that instructors are acting as role models is through a computer-based hypermedia tutorial/simulation called An Introduction to Telecommunications Featuring GINA™/CORE+. Created in HyperCard 2.3, this tutorial/simulation teaches students about telecommunications basics, introduces them to a telecommunications system sponsored by the California State University Institute (GINA™/CORE+), and provides students with information and activities for using the World Wide Web.

## Telecommunications and Education

Telecommunications is not new, but recent advancements in technology have made it easier for consumers and educators to "connect to the world." This has increased the demand for telecommunications access and training. Many commercial telecommunications services are available, as are state supported telecommunications systems and private bulletin board systems. Even so, the U.S. Congress Office of Technology Assessment (OTA, 1995) reports that only 3% of instructional rooms (classrooms, labs, and media centers) are connected to the Internet. Many educators rely on home access.

Considering the lack of Internet access in instructional rooms, providing hands-on, group training in telecommunications for teachers becomes an issue. One solution is to provide offline training using a computer-based tutorial/simulation. Offline training is advantageous because modems, phone lines, and networks are not necessary. In addition, instructors and students do not need to worry about whether they are logging in at peak hours or about scheduling around system down time. In addition, learners can work at their own paces and interact with the instruction outside of the training environment. Such training has proven to be very effective (Barron & Ivers, 1994).

## Using Hypermedia

To assist with telecommunications instruction for preservice and inservice teachers at CSUF, a computer-based tutorial/simulation was developed based on the successful design of Education Online: Getting Started with FIRN (Barron & Ivers, 1992), a computer-based tutorial/simulation designed to teach Florida educators about telecommunications basics and the Florida e-mail system. The tutorial/simulation, An Introduction to Telecommunications Featuring GINA™/CORE+, is designed to teach California educators about telecommunications basics, introduce educators to a telecommunications system sponsored by the California State University Institute (GINA™/CORE+), and to provide educators with information and activities for using the World Wide Web.

The tutorial/simulation was developed in HyperCard 2.3 for use in the Macintosh computer lab in the CSUF Department of Elementary and Bilingual Education. Developed as a stand-alone application, neither HyperCard nor HyperCard Player are necessary to run the tutorial/simulation. HyperTalk was used to customize the menu bar, capture and analyze user input, and control navigation variables. HyperCard's coloring tools were used to enhance the presentation of information; however, the majority of graphics were created and painted in other programs. For distribution purposes, the size of the program (compressed) was limited to one high density diskette. HyperCard was chosen as the authoring tool because of its scripting component, ease of use, run-time module option, and availability.

## The Tutorial/simulation

### *Layout*

After viewing the title screen, the user is provided with instructions for navigating his/her way through the tutorial/simulation. Next, the user is required to enter his or her first and last name into the program (see Figure 1). This is to help simulate his/her username during the simulation portion of the program.

After the introduction and name screens, An Introduction to Telecommunications Featuring GINA™/CORE+ is divided into four main sections: Telecommunications Basics, Introduction to GINA™/CORE+, GINA™/CORE+ Simulation, and Internet Activities (see Figure 2).

Each of these sections have three or four subsections. For example, Telecommunications Basics is comprised of Telecommunications Overview, More About Modems, and Telecommunications Software (see Figure 3). Telecommunications Overview defines telecommunications and provides concrete, animated examples of how messages are sent and received. More About Modems includes an animated example of how modems modulate and demodulate data. This section also discusses the difference between external and internal modems and modem speeds. Telecommunications Software provides the user with background information and practice with configuring terminal-based telecommunications software.

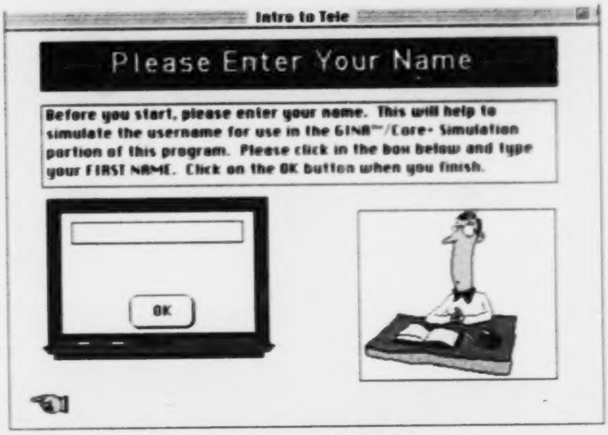
Introduction to GINA™/CORE+ includes About GINA™/CORE+, Configuring GINA™, and GINA™ Options. About GINA™/CORE+ provides background information about GINA™/CORE+ and account options. Configuring GINA™ demonstrates how to install and configure the GINA™ software. GINA™ Options provides the user with a point-and-click interface for learning more about the GINA™ environment.

The GINA™/CORE+ Simulation section features simulations that demonstrate the following:

- Logging in and out of GINA™/CORE+.
- Reading and replying to messages.
- Creating and sending messages.
- Deleting and filing messages.

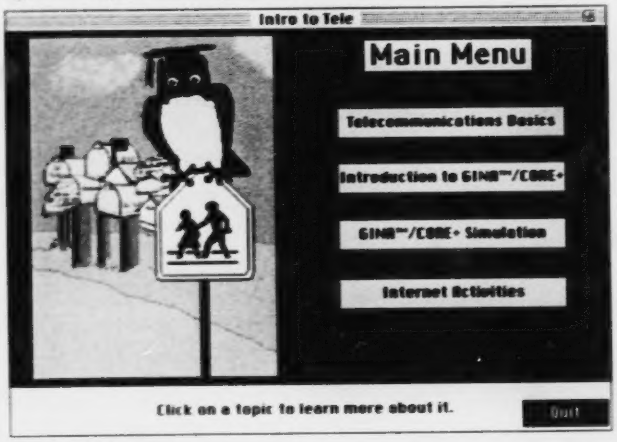
The user's name, which was entered and captured at the beginning of the program, is used in the simulations to illustrate the setup of mail messages.

The last section, Internet Activities, includes Introduction to the Internet, Making the Connection, and Instructional Ideas and Activities. Introduction to the Internet introduces the World Wide Web and defines Internet terms. Making the Connection teaches the user about URLs. Instructional Ideas and Activities provides several, printable cards containing various World Wide Web sites and instructional ideas.



Before you start, please enter your name. This will help to simulate the username for use in the GINA™/Core+ Simulation portion of this program. Please click in the box below and type your FIRST NAME. Click on the OK button when you finish.

*Figure 1. Sample screen that gives instructions to the user*



Click on a topic to learn more about it.

*Figure 2. Main menu*

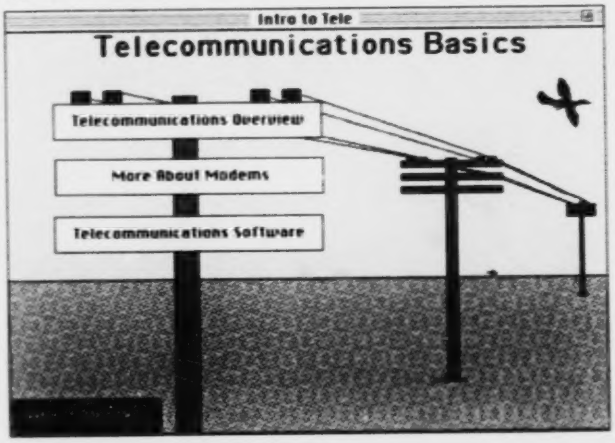
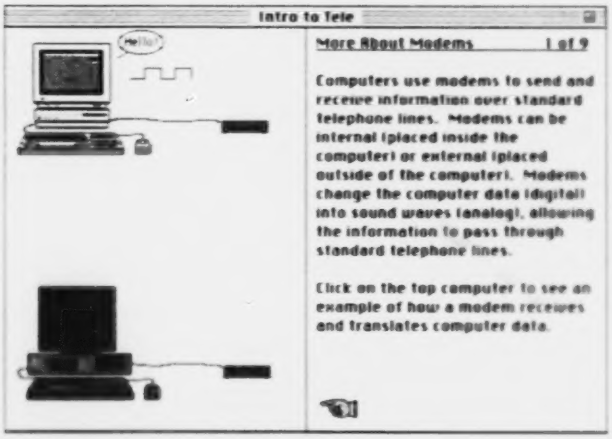

Intro to Tele
Telecommunications Basics
Telecommunications Overview
More About Modems
Telecommunications Software

*Figure 3. Telecommunications Basics menu*

***Design***

The design of this tutorial/simulation was based on recommendations by Alessi and Trollip (1991), Milheim and Martin (1991), Tennyson (1981, 1980), Hannafin (1984), Hobbs (1987), Jonassen (1985), and Kulik and Kulik (1988). Users are requested to enter or click on responses throughout the program, and review questions follow most of the subsections. Animation is used to illustrate concepts: For example, digital and analog wave formats are used to illustrate how modems send and receive information (see Figure 4).



More About Modems 1 of 9

Computers use modems to send and receive information over standard telephone lines. Modems can be internal (placed inside the computer) or external (placed outside of the computer). Modems change the computer data (digital) into sound waves (analog), allowing the information to pass through standard telephone lines.

Click on the top computer to see an example of how a modem receives and translates computer data.

*Figure 4.*

Animation and sound are also used to simulate logging into a system and sending a message. Screen captures enhance the fidelity of the simulation portion of the program, and online system messages are recreated using hide- and show-field commands. When a user completes a section, the menu choice darkens, but can still be accessed for review. Feedback is provided throughout the tutorial/simulation, and users can access topics according to their individual needs. In addition to the Main Menu, menu topics are available under a menu bar labeled Tutorial. Users may exit the program at any time.

## Conclusion

Instructor and student response to An Introduction to Telecommunications Featuring GINA™/CORE+ has been very positive. This tutorial/simulation allows students to learn about telecommunications basics, GINA™/CORE+, and the World Wide Web at their own pace, while also giving them interactive, guided instruction. In addition, it allows instructors to model the use of technology as a teaching/learning tool. This program is also an example of one of the many ways in which hypermedia can be used to enhance instruction, and it serves as a model for interactive hypermedia design.

*Note*: For those who are interested, An Introduction to Telecommunications Featuring GINA™/CORE+ is available for duplication. It will soon be available online, too. The tutorial/simulation requires a color Macintosh system with at least 4Mb of hard disk space. Inquiries or comments should be directed to the author.

## Contributor

***Karen S. Ivers*** *is an associate professor and the computer coordinator at California State University, Fullerton, Department of Elementary and Bilingual Education, 800 N. State College Boulevard EC-376, Fullerton, CA 92634-9480; 714/773-3411 or 714/773-2470; kivers@fullerton.edu*

## References

Alessi, S. M., & Trollip, S. R. (1991). *Computer-based instruction: Methods and development* (2nd ed.). Englewood Cliffs, NJ: Prentice Hall.

Barron, A., & Ivers, K. (1994). Training materials for telecommunications: Eliminating "teleconfusion." *Journal of Technology and Teacher Education, 2*(2), 129–142.

Barron, A., & Ivers, K. (1992). Education online: Getting started with FIRN [Computer software]. Tampa, FL: University of South Florida.

Hannafin, M. J. (1984). Guidelines for using locus of instructional control in the design of computer-assisted instruction. *Journal of Instructional Development, 7*(3), 6–10.

Hobbs, D. J. (1987). Effects of embedded processing tasks on learning outcomes. *Programmed Learning and Educational Technology, 24*(2), 145–150.

Jonassen, D. H. (1985). Interactive lesson designs: A taxonomy. *Educational Technology, 25*(6), 7–17.

Kulik, J. A., & Kulik, C. C. (1988). Timing feedback and verbal learning. *Review of Educational Research, 58*(1), 79–97.

Milheim, W. D., & Martin, B. L. (1991). Theoretical bases for the use of learner control: Three different perspectives. *Journal of Computer-Based Instruction, 18*(3), 99–105.

Tennyson, R. D. (1981). Use of adaptive information for advisement in learning concepts and rules using computer-assisted instruction. *American Educational Research Journal, 18*(4), 425–438.

Tennyson, R. D. (1980). Instructional control strategies and content structure as design variables in concept acquisition using computer-based instruction. *Journal of Educational Psychology, 72*(4), 525–532.

U.S. Congress Office of Technology Assessment. (1995). *Teachers and technology: Making the connection* (OTA-EHR-616). Washington, DC: U.S. Government Printing Office.

# TurtleView:
# A 3D Turtle Geometry Program

*Michael J. Laszlo*

This article describes TurtleView, a program that realizes turtle geometry in a 3D virtual world. In turtle geometry, a "turtle" is manipulated via commands and procedures written in a scripting language. Turtle geometry was popularized and is most closely identified with the programming language Logo. TurtleView extends the standard turtle geometry model supported by Logo. It provides a 3D space (as opposed to the 2D plane in most other Logo environments), supports a limited capability to generate scenes both manually and by scripting, and generates walk and fly views of the scene from the turtle's perspective.

TurtleView was written in SuperCard, an authoring system produced by Allegiant Corporation. SuperCard closely resembles HyperCard. The scripting language behind SuperCard is called SuperTalk. I found it most natural not only to write TurtleView in SuperTalk, but also to employ SuperTalk as the scripting language with which users manipulate TurtleView's turtle. SuperTalk has an English-like syntax that is easy to learn and use. Moreover, the program uses the SuperTalk interpreter that comes with SuperCard.

## Goals of the Project

There are two primary goals for this project. The first goal surely coincides with a key goal of Logo: to provide students with a fun, user-friendly, and extensible environment in which to experiment with interesting ideas and create neat worlds. The second goal is to provide a system in which to explore some of the ideas and techniques used in virtual reality programming. Certainly virtual reality programs far more sophisticated than TurtleView exist (just as drawing programs that are far more sophisticated than Logo exist). The advantage of TurtleView lies in the fact that the user can study and modify the program itself to explore some of the techniques used to produce virtual reality. This is possible because the program is written in SuperTalk, and the scripts and objects that comprise it can be explored in the SuperCard editing environment.

## The TurtleView Model

In the model employed by standard turtle geometry, commands and procedures are executed to move a turtle around the plane. The turtle traces its path as it travels whenever the "pen" it carries is down. At any given time, the turtle's state is described by its position in the plane, its heading (the direction it is facing), and whether its pen is up or down. There are three basic commands in turtle geometry for modifying the turtle's state, and thereby its behavior:

- Forward *nsteps*—This command moves the turtle *nsteps* units in the direction it is facing and draws the path it follows if the pen is down. The turtle moves forward if *nsteps* is positive, and backwards if *nsteps* is negative
- Turn *a*—This rotates the turtle *a* degrees in place. Rotation is clockwise if *a* is positive, counter-clockwise if *a* is negative.
- Pen [*up*|*down*]—This command describes whether the pen carried by the turtle is to be up or down.

TurtleView's model differs in two key ways from that of standard turtle geometry. First, the turtle moves in 3D space rather than in the 2D plane. The turtle's position is determined by a point (x, y, z) in space, and its heading is determined jointly by its turn angle and its pitch angle. The pitch angle is the angle between the turtle and the floor, and represents the extent to which the turtle is looking up or down. Pitch values lie in the range [-90, 90]. At pitch 90 degrees the turtle looks straight up at the zenith; at pitch -90 degrees straight down at the floor. The turtle is parallel to the floor at pitch 0 degrees.

Second, there exists a scene through which the turtle moves. The scene consists of a set of walls, trapezoidal polygons that are anchored to the floor and are of varying height. The walls can be constructed manually with the mouse or by scripting turtle movements with the pen down. Because the TurtleView model posits a scene, the program provides two views of the scene: one as it appears to the turtle and one overhead view.

To support this model, TurtleView introduces some new operations and modifies the behavior of the operations it inherits from standard turtle geometry:

- Forward *nsteps*—This command moves the turtle forward *nsteps* units in its heading direction in 3D space.

Moreover, if the pen is down, this operation creates a new wall along the turtle's path. The wall is perpendicular to the floor; its bottom edge lies in the floor and its top edge coincides with the path taken by the turtle. Note that the top edge of the wall is parallel to the floor if the turtle's pitch is 0 degrees, and it slopes otherwise.

- Pitch *a*—This command changes the turtle's pitch in increments of *a* degrees. The turtle looks higher toward the sky's zenith if *a* is positive, and lower toward the floor if *a* is negative.
- Turn *a*—This command rotates the turtle *a* degrees in place. Rotation is independent of pitch. Rotation is clockwise if *a* is positive, and counterclockwise if *a* is negative.
- Zoom *f*—This command divides the current field-of-view angle by *f*. The turtle's view zooms in if *f* > 1 and zooms out if *f* < 1.

## Using TurtleView

TurtleView supports two user modes: Design Mode and Run Mode. In Design Mode, the user draws walls into the scene within the overhead view. In Run Mode, TurtleView executes the commands and procedures issued by the user and updates the scene and the turtle's state and views accordingly.

### *Design Mode*

The main window in Design Mode provides an overhead view of the scene. This window is titled "Turtle Land" in Figure 1. The user drags individual walls into the scene using the crosshair-shaped cursor. Because the scene is independent of the turtle, the turtle is not visible in the overhead view during design. Accompanying the main window is a floating palette (as shown in Figure 1) that provides a matrix of colors from which the user can choose. The floating palette also includes an editable text box for setting the height of walls. To create and position a wall in Design Mode, the user drags the cursor in the "Turtle Land" window. The resulting wall is anchored to the floor, and assumes the color and height currently indicated by the floating palette.

### *Run Mode*

Three windows are visible in Run Mode. The "Turtle Land" window provides an overhead view of the scene including the turtle (see Figure 2). It is identical to the "Turtle Land" window in the Design Mode except for the fact that the turtle is visible in the view. The "Turtle View" window shows how the scene appears to the turtle, given its current position and heading (see Figure 3).

The third window in Run Mode, called the "Transcript" window, is used to enter and execute commands and to define new procedures (see Figure 4). The "Transcript" window contains a scrolling editable text box into which the user types commands and procedures. Any SuperTalk instruc-

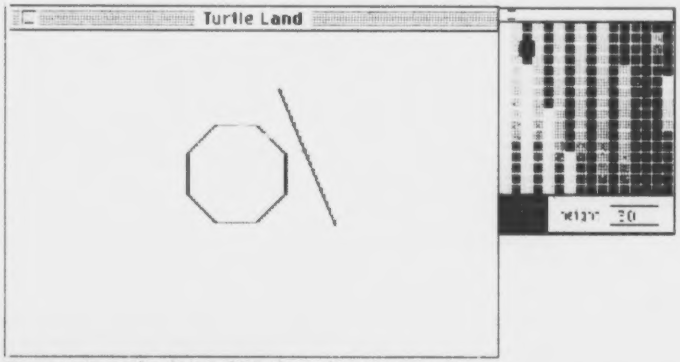


*Figure 1. An overhead view of "Turtle Land" in Design mode*

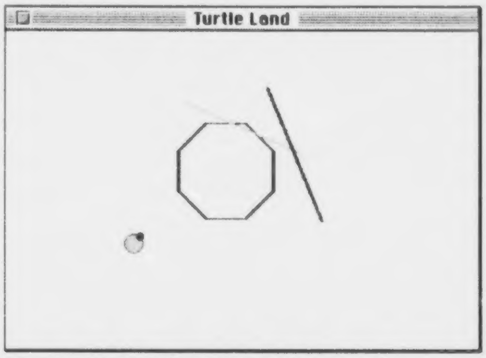
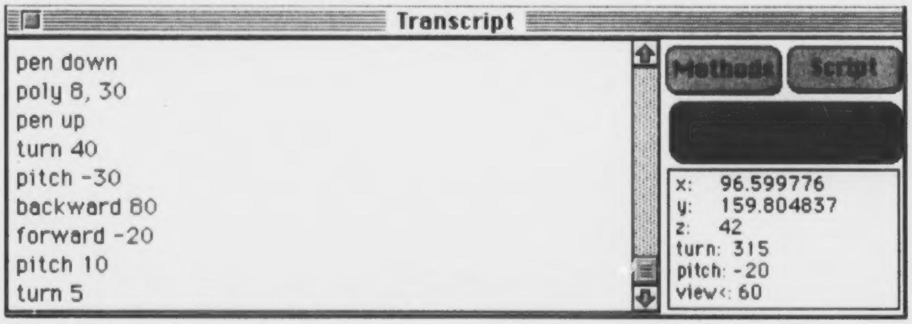


*Figure 2. An overhead view of "Turtle Land" in Run mode*

Turtle View

*Figure 3. The turtle's point of view*



```
pen down
poly 8, 30
pen up
turn 40
pitch -30
backward 80
forward -20
pitch 10
turn 5
```

```
x:    96.599776
y:    159.804837
z:    42
turn:  315
pitch: -20
view<: 60
```

*Figure 4.*

tion or construct can be executed from this text box, including the commands specific to TurtleView. To execute a command, the user clicks the I-beam cursor in the command line and clicks on the "Run" button. To execute a block of commands, the user selects the sequence of commands to be executed (by dragging the I-beam cursor across the commands) and clicks on the run button.

The "Transcript" window contains two other buttons besides "Run." Clicking on the "Methods" button brings up a script-editing window in which the user can define and edit SuperTalk procedures. These procedures represent the turtle's current repertoire of behaviors. For example, the procedure **call poly** 8, 30 issued in the "Transcript" window called the procedure **poly** that had been defined in the script editing window. **Poly** causes the turtle to trace a regular 8-sided polygon whose sides have length 30. Because the pen was down when the procedure was called, the turtle created eight walls when it moved. **Poly** is defined as follows:

```
to poly nbrsides, len
        repeat nbrsides
                forward len
                turn (360 / nbrsides)
        end repeat
end poly
```

Procedures can be edited or deleted and new procedures can be defined in the script editing window.

Clicking on the "Script" button of the "Transcript" window brings up a window that displays the block of commands that would be executed the next time the "Run" button is clicked, assuming no instructions in the "Transcript" window are currently selected.

The "Transcript" window also displays the turtle's current position, heading, and zoom. The origin lies at the lower-left corner of the "Turtle Land" window, x extends to the right, y extends up, and z extends out of the screen toward the user. East lies at 0 degrees, and degrees increase in clockwise rotation (e.g. south lies at 90 degrees). The last entry, view <, indicates the turtle's field-of-view angle. Zooming in decreases this value, and zooming out increases it.

## Computing Issues

TurtleView represents a scene as a structured collection of polygons. The polygons are fragments of the walls that comprise the scene. The polygons are structured by a data structure known as a binary search partition tree, or BSP tree. BSP trees are used in many programs that provide walk and fly views or 3D scenes, such as virtual reality programs and computer games.

In computer graphics, rendering is the process of obtaining an image of a 3D scene from a particular point of view. In other words, rendering provides a view of a scene. Rendering is a nontrivial problem because some objects in the scene may occlude (or partially occlude) other objects, and only unobscured objects should be visible in the view. The advantage of BSP trees lies in the fact that it supports fast rendering of the scene. The BSP tree sorts the scene polygons from far to near, relative to the position from which the turtle views the scene. The polygons can be displayed safely in this order—if a polygon appears in the view, then any polygon that overlaps it will have been displayed before it is displayed. This is no different from how artists first paint the backgrounds of their paintings, then add objects at intermediate depth, and add objects in the foreground last.

One interesting thing about TurtleView is that polygons visible in the "Turtle View" window are independent objects. Moreover, even the polygons that are within the turtle's field-of-view but hidden by closer polygons exist as objects inside the "Turtle View" window—they are present but hidden. In TurtleView, the user can examine how the view in the "Turtle View" window was composed. He can select polygons, move them to the side, and thus reveal the hidden polygons that lie behind them. In fact, he can examine the entire stack of polygons generated by the BSP data structure relative to the turtle's current position and heading. Thus, the program provides a way to understand and explore a powerful technique in virtual reality programming.

Because SuperTalk executes in an interpreted environment, the turtle's views displayed in the "Turtle View" window are not generated instantaneously. They may take from a fraction of a second to several seconds to appear, depending on scene complexity.

## Conclusion

TurtleView adapts the standard turtle geometry model to virtual reality. Although not as sophisticated as commercial virtual reality programs, it has something these programs lack. It is fun to program a turtle's behavior, watch it carry out the instructions, and view the scene from his perspective. Moreover, TurtleView provides a window into some of the techniques used in real-world virtual reality programming.

## Contributor

***Michael J. Laszlo** is an associate professor at the School of Computer and Information Sciences, Nova Southeastern University, 3100 SW 9th Avenue, Ft. Lauderdale, FL 33315; mjl@scis.nova.edu.*

# Helping Students Design World Wide Web Documents

*Elizabeth Boling and Sonny Kirkley*

What are the primary design issues to consider when authoring for the World Wide Web? During the past 21 months the authors have conducted multiple Web-design workshops with K–12 teachers, school administrators, college faculty, and technical staff from schools. We also teach novice Web designers, develop Web documents and sites, and study the design guidelines emerging from the Web community itself. From all these sources, we have assembled a list of design issues that is evolving even as we write. This article presents a snapshot of that list to assist authors who are just jumping onto the Web.

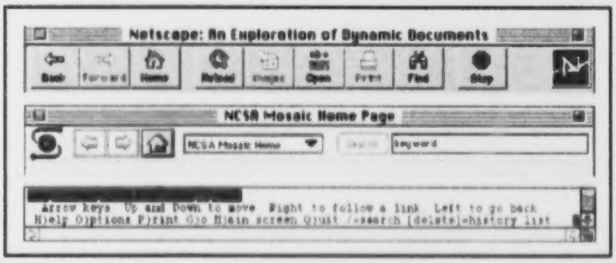
"Part I: Planning and Designing the Site," which appeared in *HyperNexus* volume 6 number 4, helps new developers get ready to publish on the Web. "Part II: Designing and Maintaining the Pages," in this issue, addresses the design of actual documents, or pages, for the Web, and includes some tips on making a Web site easy to maintain once it exists.

# Part II: Designing and Maintaining the Pages

Publishing documents on the World Wide Web involves complex design processes that require extending the design skills we already expect students to use when creating printed materials. Novice designers of Web pages will be successful if they bring their existing knowledge to the task and then focus on the unique aspects of designing for an electronic, worldwide, and interactive medium.

## Navigation Design

Although Web browsers all include navigation functions of their own that allow users to go forward and backward between documents they have visited recently(see Figure 1), these functions are not sufficient to provide for the needs of visitors to a Web site. This is because the browser knows about the pages a user has visited but *only in the order that they have been visited,* and, of course, the browser does not know anything about the structure of the particular site being visited.



Arrow keys: Up and Down to move. Right to follow a link; Left to go back.
H)elp O)ptions P)rint G)o M)ain screen Q)uit /=search [delete]=history list

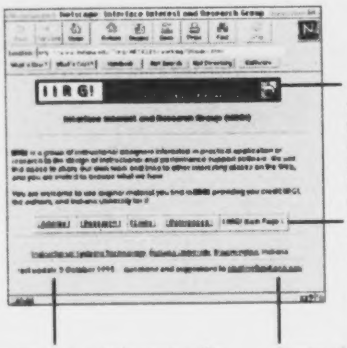
*Figure 1. Navigation systems in Netscape, Mosaic, and Lynx*

In addition to the forward, backward, and home functions supplied by the browser, students should design site-specific navigation into their documents. They may want to supply forward and backward navigation between sequential documents at a given level, links at the top of documents to help users "jump" to different sections of that document quickly, and links to the major sections of the site. When providing navigation options, the designer must consider accessibility, consistency, and usability.

### *Accessibility*

*"Main Page" links*

The visitors to a site should be able to reach all the levels of the site—even though the link that brought them there may have taken them directly to a document at a second, third, or lower level. Without a link back to the main document ("home page" or "main page") of a site, documents at the lower levels become "dead ends" in the sense that anyone coming directly to them has no way to get to any other documents at that site. If a document is very deep in the site's structure, it may also contain a link to the next higher level, even though that level is not the "main" one. Many sites provide a "navigation bar" at the top or bottom of every page that contains links to the main document for the site and to other key access pages within the site. This bar might also include "next" and "previous" links for documents meant to be viewed sequentially (see Figure 2).


Netscape: Interface Interest and Research Group
IIRG!
Interface Interest and Research Group (IIRG)

*Visual identity symbol*: This symbol appears on all the pages in this site.

*Landmark graphic*: This graphic appears on all the major access pages of this site.

*Navigation bar*: This bar appears at the bottom of every page in the site—the link to the current page is not active because we're already there.

*Currency of information*: The date of revision appears at the bottom of every document.

*Source of information*: This link allows users to send electronic mail to the maintainer of the site.

*Figure 2.*

### *Landmarks*

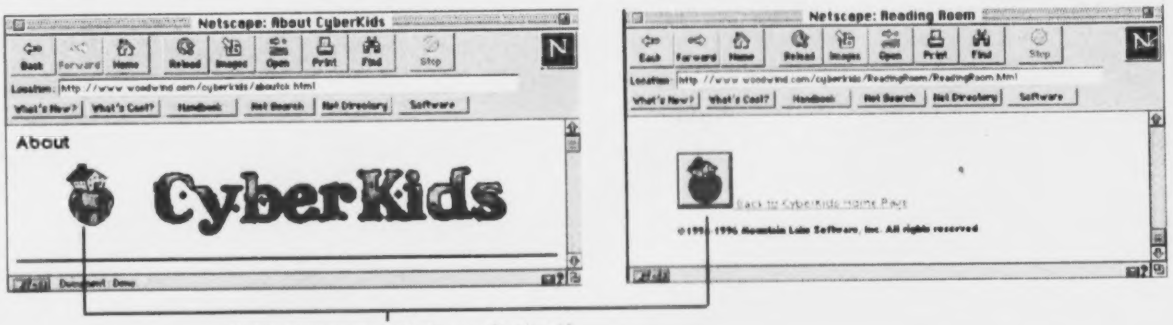
People use "landmarks" to find their way around linked, or hypertext, documents like the ones on the Web. This is especially true when they're lost; they look for a recognizable page or picture so they can "back up and start over." The easiest way to create a landmark is to give the main document a specific name and include that name as a link on every other page in a site. To make things even easier for visitors, a picture—a miniature version of the picture on your main document or a small section of that picture (see Figure 3)—can be used to identify the link that will return users to the main document. This technique serves two purpose; it helps people who might otherwise get lost in the site, and it reminds people that the pages they are viewing belong to that site.

### *Consistency*

Anyone who is visiting a site has to figure out how the site designer has things organized. If they can't figure this out, they'll probably go somewhere else pretty quickly; therefore, the simplest organization that works is probably the best. An easy way to make the organization of a site obvious to visitors is to make the navigation functions for all your documents consistent. Designing a navigation bar that appears at the bottom of every document in the site is a good start (see Figure 4). Students can also agree on standards for navigation elements that everyone may want to use, like alphabet bars, index and "return to index" links, and names of links (Figure 4).

### *Usability*

No matter how much experience a designer has, his products will not always be easy to use. It can be especially hard for student designers to anticipate the problems that users of their Web documents might encounter. Simple forms of the professional usability testing techniques used by commercial software developers will yield eye-opening data for students who take the time to try them. Encourage students to show their documents to people who have not actually been involved in the design process (students from other classrooms will usually work well). The key issue in this type of testing is to create, to the extent possible, the conditions under which that person would ordinarily be using the documents; most of the time this


Netscape: About CyberKids
Back
Forward
Home
Reload
Images
Open
Print
Find
Stop
Location: http://www.woodwind.com/cyberkids/aboutck.html
What's New?
What's Cool?
Handbook
Net Search
Net Directory
Software
About
CyberKids
Document: Done
Netscape: Reading Room
Location: http://www.woodwind.com/cyberkids/ReadingRoom/ReadingRoom.html
Back to CyberKids Home Page
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World and house symbol serves as "landmark"

*Figure 3.*

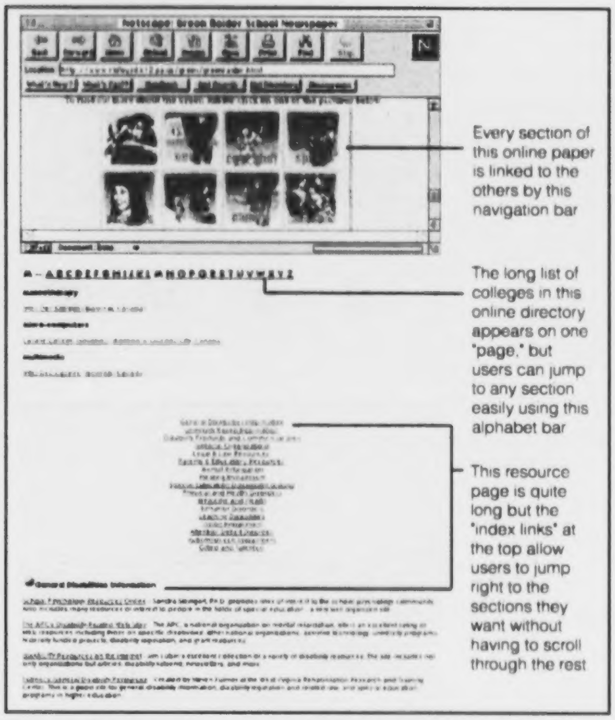

Netscape: Green Raider School Newspaper
Every section of this online paper is linked to the others by this navigation bar
The long list of colleges in this online directory appears on one "page," but users can jump to any section easily using this alphabet bar
This resource page is quite long but the "index links" at the top allow users to jump right to the sections they want without having to scroll through the rest

*Figure 4. Navigation schemes from "The Online Green Raider" student newspaper, the LaSalle College Group of vocational colleges, and the "Special Education Resources" page*

means that the designer won't actually be there. For the test session, then, the designer must refrain from explaining, helping, or taking over and showing the person how to use the documents. Adult designers find this difficult to do; some students may find it almost impossible. To avoid the temptation to "take over" a session students can work in teams, reminding each other not to help the user, or one student can observe people using another student's design and report what they've seen to the designer. Experience with novice designers suggests that even a flawed test session will frequently bring to light the confusing aspects of a design—sometimes the same aspects that the novice stubbornly refused to change based on "expert advice" from an instructor!

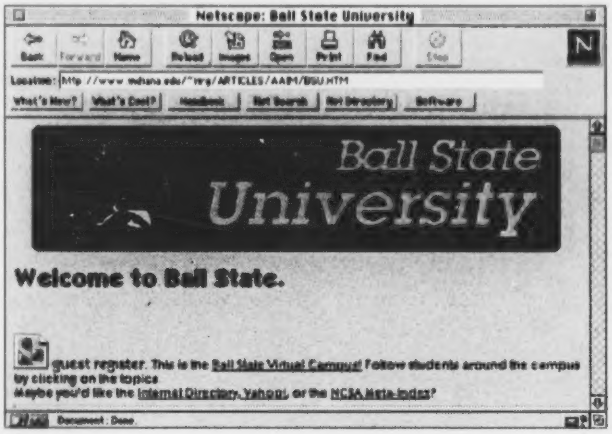
## Visual Design

### *Visual Identity*

The visual appearance of Web pages conveys a message about that Web site, the designer who created it, and whatever organization that designer may be part of. Graphic designers call this message a "visual identity." The message goes out to the world whether the designer intends it to or not; therefore, it is important to ask what message the visual design of a site is sending and to spend some effort ensuring that the message is consistent with the goals of the site. Choice of image is an obvious place to start establishing a visual identity. The literal content of images—people, buildings, objects, and so on—is perceived by almost everyone, even people who won't take time to read a lot of text.

Figure 5 shows an early version of the main document for the Ball State University site. Ball State University had chosen at that time to represent itself with the image of their sports mascot; whether the intention was conscious or not, the designers of this document were sending the message that sports are the defining image of the university.

If you visit the Ball State site today, you will see the image in Figure 6. This visual identity centers around students holding books, a clear message that students and academic activities are the defining image of the university.


Netscape: Ball State University
Back
Forward
Home
Reload
Images
Open
Print
Find
Stop
N
What's New?
What's Cool?
Handbook
Net Search
Net Directory
Software
Ball State University

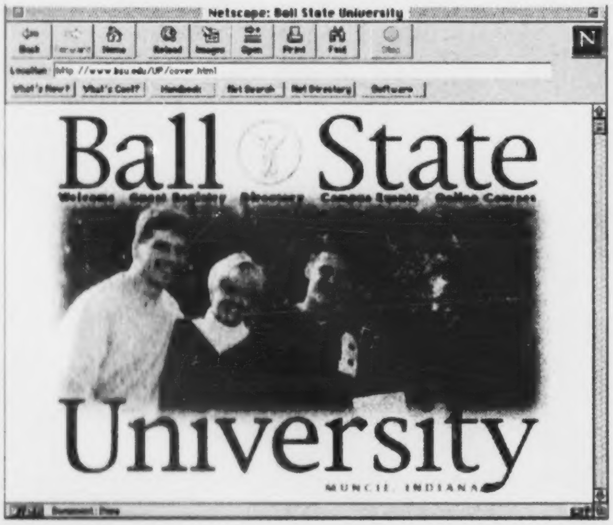
Location: http://www.indiana.edu/~iwg/ARTICLES/AAIM/BSU.HTM

Welcome to Ball State.

guest register. This is the Ball State Virtual Campus! Follow students around the campus by clicking on the topics
Maybe you'd like the Internet Directory, Yahoo!, or the NCSA Meta-Index?

Document: Done.

*Figure 5.*


Netscape: Ball State University
Back
Forward
Home
Reload
Images
Open
Print
Find
Stop
N
What's New?
What's Cool?
Handbook
Net Search
Net Directory
Software
Ball State
Welcome
Guest Registry
Directory
Campus Events
Online Courses
University
MUNCIE, INDIANA

Location: http://www.bsu.edu/UP/cover.html

Document: Done

*Figure 6.*

Student designers should take time to discuss what the images on their main documents are going to communicate to their constituents, their stakeholders, and the rest of the world.

### *Color*

People have strong emotional reactions to color, and they tend to make with certain colors associations based on cultural experience (e.g., use of red for "stop" and green for "go"). Colors also interact with each other in complex ways, producing different perceptions depending on which other colors are around them and how much of each color is present. Color is both powerful and complicated; novices are usually cautioned to use it carefully and sparingly. Because color is fun, though, most novices ignore this caution quite cheerfully and persistently.

Two guidelines regarding the use of color are worth introducing to students and emphasizing throughout revisions of their documents. Neither guideline calls for resisting or restricting the use of color, but both will provide foundations for good practice as student designers mature.

1. No matter how many colors are used in a single document, use enough of any *one* of them in the design that people can identify it as the dominant color. This helps the design "hang together" and avoid the "polka dot" or "clown" look that sometimes results from using lots of different colors together.
2. For text and other elements to be legible, the light-dark contrast between each element and its background must be strong. If students follow this guideline they can avoid producing documents that are unreadable, even if people don't especially like their color choices.

Many combinations of color have more than one cultural meaning, like the red and white of the Coca-Cola™ logo and the red and white of the ubiquitous STOP sign. Some colors carry meanings we may or may not appreciate, like the "pink and purple aisles" at the toy store where every boy knows they keep the "girl toys." Designers can't ignore those meanings because the audience will not ignore them and, in fact, may interpret material differently than the designer intends, based in part on the colors being used.

Of course, context influences the way people will perceive the meaning of a color combination, so students do not need to avoid *all* color combinations so much as recognize when they have combined color and any other factors to create inadvertent, and unwanted, messages in their designs. As an example, consider the apple image in Figure 7. Even though it is reproduced here without color, the shape of this apple is so recognizable that if a student designer combined it with the rainbow colors used by Apple Computer, Inc., people would "read" Apple Computer—no matter what the student actually intended (and so would Apple Computer!).

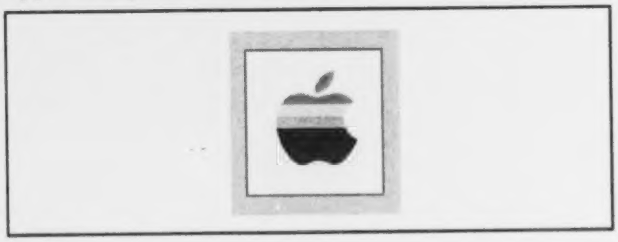


Figure 7.

### *Images*

*Functional value*

Images are fun. Users like to see them and student designers like to include them in documents. They do take time to load when a user links to the document, though, so student designers should consider the contribution each image is going to make to the document. Decorative elements in a document should contribute substantially to "setting the mood" for the information. Illustrations should be relevant to the content and charts or diagrams should be small enough to be seen without scrolling, but large enough to be legible.

The most common misuse of images on the Web right now seems to be the use of relatively large images for navigation (Figure 8), either "buttons" or image maps (images with embedded links).

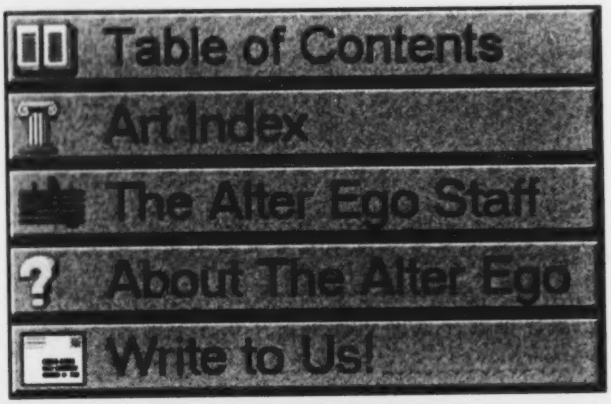


*Figure 8. Large navigation buttons from an online magazine*

Most button images are unnecessary because links are automatically highlighted in Web documents anyway. If button images are used to give the document a "polished" look, they should be small and unobtrusive to avoid giving the document a "pimply" look. Image maps are great for content that lends itself to the "map" treatment—actual maps, diagrams with distinct subsections, and "visual outlines." They should be used cautiously in other situations, though, because they usually have to be large in order to work, and they can be confusing if the clickable items in the picture are not carefully chosen.

*Technical Considerations*

Images to be viewed within documents should be restricted to 256 colors in most cases, although they may be created in thousands or million of colors and then converted (JPEG images are much higher quality, but they look terrible on monitors set to fewer colors and some older browsers will not display them at all). The less memory an image takes to store, the more quickly it will load when a document is accessed. Even a 100K image can take a long time to load if the user is viewing the Web using a slow modem connection (like the ones used in many schools).

*Nongraphical Browsers*

Many users are restricted to nongraphical browsers, which do not display images at all. Designers should make use of the Web feature that allows them to designate text that will appear instead of the image when the document is displayed without images. They should also view their own documents without images before they are published to see how they will appear to many of their users.

## Technical Design and Design for Maintenance

### *Standards*

Most organizations, whether they are whole universities or single classrooms, find that maintenance of a Web site improves when all the contributing designers adhere to a minimum set of standards. Common elements subject to standardization within a site are:

- File and directory names for documents.
- Navigation elements (e.g., navigation bar, button graphics, and links).
- Visual identity and landmark graphics.
- Update and contact information.

If the standard elements that appear in the document are grouped together at the bottom or at the top, designers can have a lot of freedom in the body of the document and still follow the rules.

### *Procedure Logs*

A procedure log is simply a detailed list of the steps a designer has taken in some aspect of creating or revising a document. Procedure logs are used by a single designer to streamline processes that have to occur many times, or by several designers to ensure that everyone follows a process the same way with the same results. Procedure logs are usually created "after the fact," that is, after a process is already done and the designer has realized that there is some necessity for repeating the process reliably and efficiently. For those designers who do not have access to automated scripts for changing all the documents in a site, procedure logs are most useful for allowing several people to help with the process of editing and updating multiple documents. Someone should check the procedure log to make sure nothing is missing or incorrect before a group starts using it to change documents.

### *Site Maps*

Site maps are necessarily abstract and may not be useful for very small sites or very young designers. When a site reaches more than two levels, though, it is helpful to create a map, or diagram, that shows what the major documents are and how they are linked together (see Figure 9). Once a site has been constructed, the designer or maintainer of the site may not visit certain documents within it very often, and the map can be used to keep track of documents that might otherwise be forgotten. A site map is also handy for checking off revisions that apply to multiple documents and for keeping multiple designers organized when they are all publishing documents on the same site. If there are technical support people associated with a Web site, they will appreciate the overview of files that the site map affords.

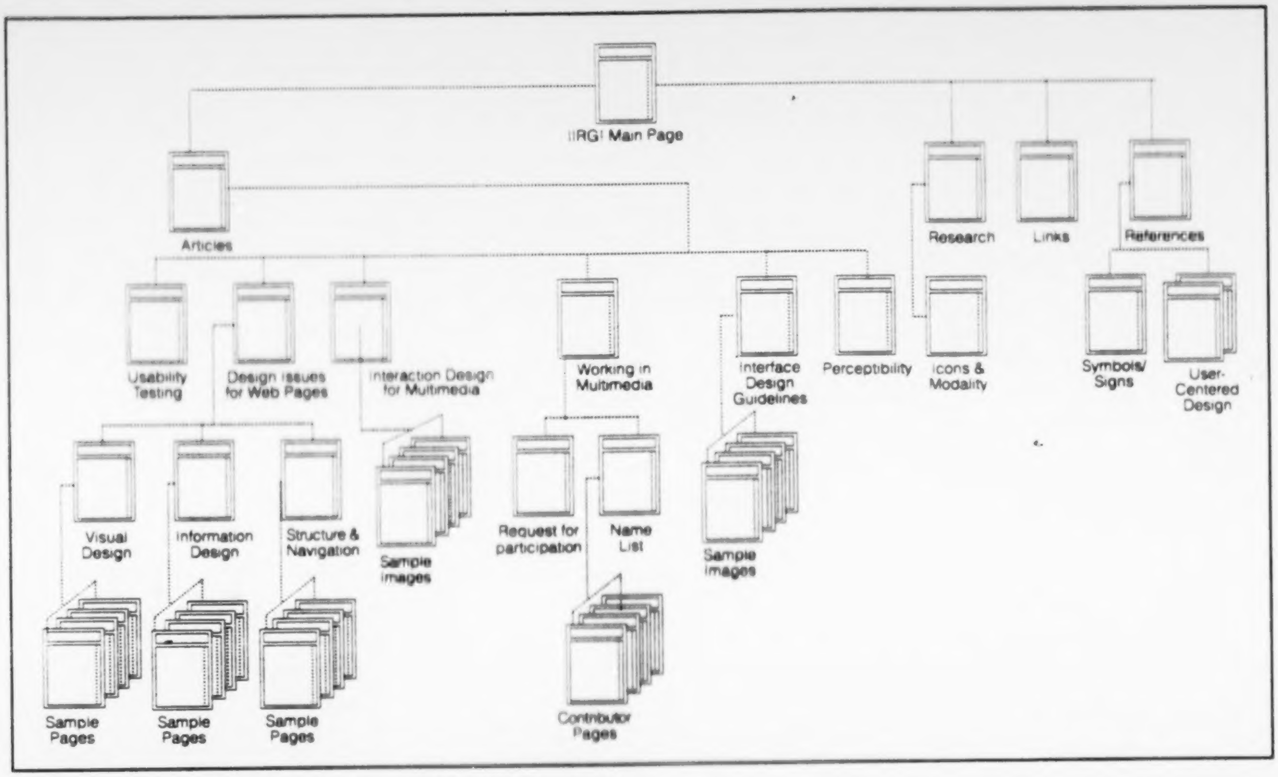
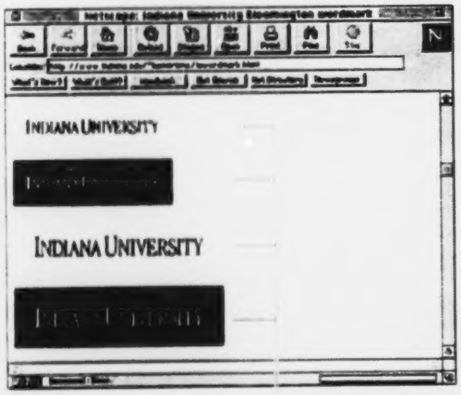

IIRG! Main Page
Articles
Research
Links
References
Usability Testing
Design Issues for Web Pages
Interaction Design for Multimedia
Working in Multimedia
Interface Design Guidelines
Perceptibility
Icons & Modality
Symbols/ Signs
User-Centered Design
Visual Design
Information Design
Structure & Navigation
Sample Images
Request for participation
Name List
Sample Images
Sample Pages
Sample Pages
Sample Pages
Contributor Pages

*Figure 9. Sample site map from the Interface Interest and Research Group (IIRG!)*

### *Online Resources*

Some of the technical burdens of Web site maintenance can be reduced for individual designers if certain resources are placed online for everyone to use. These might include standard graphics (such as those for Indiana University that are shown in Figure 10), navigation bars for students to copy into their own documents, and how-to documents or procedure logs for various parts of the publishing process. Publishing these items online can also encourage designers to follow standards because it is easier to use the "standard" items than it is to create alternatives.


INDIANA UNIVERSITY
INDIANA UNIVERSITY

Designers can copy these images directly from the "official standards collection"

*Figure 10. Sample from Indiana University's online library of standard images*

## Conclusion

The relative ease with which students and teachers can author documents for the World Wide Web (WWW) is deceptive. It's very easy to "get a page up on the Web," but once we have created more than two documents linked together we either have to face some critical design decisions, or we end up with a snarl of files and links that can take forever to straighten out and that confuse the people who visit the site in the meantime. By following the suggestions and standards discussen in Parts I and II of this series, students can learn how to create easy-to-use and effective Web pages.

***Elizabeth Boling** is a professor at the School of Education, Education 2224, Indiana University, Bloomington, IN 47405; eboling@indiana.edu. **Sonny Kirkley** is an Interactive Systems Designer at the Center for Excellence in Education, Indiana University, 201 North Rose Avenue, Room 2206, Bloomington, IN 47405-1006; ekirkley@indiana.edu.*

# Resources on the Web

The following list of Web-based resources is repeated from Part I of this article.

## Style Guides

***http://info.med.yale.edu/caim/StyleManual_Top.HTML***

This online manual describes the design principles used to create the pages within the Center for Advanced Instructional Media's (C/AIM) World Wide Web site. The manual includes great explanation of the "whys" behind the principles.

***http://www.indiana.edu/~wwwdocs/guidelines.html***

The Indiana University Bloomington Style Guide is a great example of minimal guidelines developed by a diverse community of Web designers. These standards are presented in an especially straightforward style.

***http://www.ithaca.edu/web_admin/IP/ip_handbook/design.html***

Ithaca College's online Information Provider's Handbook contains a very thorough Style Guide section. Some of the information there is, of course, specific to Ithaca, but the guide is a good example for site developers to follow, and it contains a lot of helpful guidelines.

***http://www.wsdot.wa.gov/Webmaster/WebDesign/guide/***

For a look at the guidelines for Web design published by a government organization, try the Washington State Department of Transportation.

***http://www.np.sg:9080/html_design.html***

Ngee Ann, a commercial Internet provider, publishes these straightforward guidelines for Web page design.

## Search Tools

***http://www.altavista.digital.com***

You'll need a forms-capable browser to use this search facility (Netscape, Mosaic and LYNX are all forms-capable). Enter one or several terms and get back a list of links from all over the Web ... this is a good way to find out how visible your site is to everyone in the world!

***http://www.yahoo.com/Education/K_12***

Still one of the friendliest and most complete indexes on the Web, Yahoo maintains extensive lists of education-related sites and actual school sites. From this K-12 page you can backtrack to all their education listings.

## Resources for Web Developers in Education

***http://cee.indiana.edu/surf.html***

The Center for Excellence in Education (CEE) at Indiana University maintains a page of Web resources for educators that is used by the hundreds of educators who attend workshops in the Center every year.

***http://cee.indiana.edu/workshops/design_server.html***

Also in the Center for Excellence site, this page was created specifically to support educators attending the workshop on Web site development. Look here for tools to make Web development easier.

***http://www.indiana.edu/~iirg/ARTICLES/articles.html***

The Interface Interest and Research Group (IIRG!) at Indiana University has published several presentations on visual design for the World Wide Web. Visit this site for updates to the information in this article.

***http://www.indiana.edu/~eric_rec/comatt/websites.html***

The ERIC Clearinghouse on Reading, English, and Communication offers a huge page of resources links to Web sites of interest to teachers. Some of them include specific resources applicable to Web development, and many of them demonstrate the kind of Web development that teachers and students are doing.

BEST COPY AVAILABLE

# NECC '96 Media and Messages: McLuhan Revisited

*Trudy Abramson*

The people at the International Society for Technology in Education (ISTE) and those coordinating the National Educational Computing Conference (NECC) strive to keep at the cutting edge of technology as exemplified by the NECC '96 CD-ROM Proceedings and the recurring brainstorming sessions on the immediate and projected roles of Web-based journals. These transitions from paper to electronic media present an opportunity to open an intellectual exchange on messages and media. Discussion of the first event appears in this article; the second will be dealt with in the next issue. I hope that this will be an open forum with input from many readers about these topics that are vital to our hypermedia/multimedia interests.

## McLuhan's Vision

More than three decades ago, Professor Marshall McLuhan, Director of the Center for Culture and Technology at the University of Toronto, revolutionized communication theories. Following are some of his remarks.

> In a culture like ours, long accustomed to splitting and dividing all things as a matter of control, it is sometimes a bit of a shock to be reminded that, in operational and practical fact, the medium is the message. This is merely to say that the personal and social consequences of any medium—that is, of any extension of ourselves—results from the new scale that is introduced into our affairs by each extension of ourselves, or by any new technology (McLuhan, 1964, p. 24).

> Societies have always been shaped more by the nature of the media by which men communicate than by the content of the communication.... It is impossible to understand social and cultural changes without a knowledge of the workings of the media (McLuhan & Fiore, 1967, p. 8).

> All media work us over completely. They are so pervasive in their personal, political, economic, aesthetic, psychological, moral, ethical, and social consequences that they leave no part of us untouched, unaffected, [or] unaltered. The medium is the message. Any understanding of social and cultural change is impossible without a knowledge of the way media work as environments (McLuhan & Fiore, 1967, p. 26).

## At the Conference

If memory serves me correctly, the transition from paper to CD-ROM proceedings at NECC conferences was done gradually. First attendees received paper proceedings. Then they could choose whether to receive paper or CD-ROM proceedings. This year attendees received CD-ROM proceedings and could purchase an additional print copy for $25.00. Upon registration at NECC '96, I was given a tote bag containing a name tag, a *Final Program*, an *Exhibitor's Guide*, and a CD-ROM copy of the Proceedings. In general, conference participants expect to be given proceedings before sessions are held. Some look for their own work and, upon finding everything in good condition, look no further. Others read the articles, one section at a time from cover to cover. Others use the proceedings articles as preparation work and make notations in the margins during sessions. Still others think of proceedings as souvenirs or resources to be referenced in the future. This was my first NECC in a decade without a paper proceedings at the outset. In the past, I typically people-networked for a while and then spent the first night immersed in the proceedings, trying to make meaningful decisions about how to best allocate my time during the next three days. Now I had only a Final Program and a "black box." On the plus side, the CD weighs almost nothing and makes no demand for space in my luggage. Because my laptop has no CD drive, I was effectively deprived of the contents of this medium during the course of the conference. My thoughts turned to McLuhan (1964).

Here was an opportunity to investigate his theory of the medium is the message.

The first investigation consisted of informal questioning about the technological format change. The authors I spoke with indicated that they paid for the paper copy. Some of the first-timers maintained they really had not given it any thought at all. One person said he selected sessions by recognition of presenter name, admittedly precluding good work by newcomers. Another said that he decided to avoid paper sessions because that much, at least, could be accessed from the CD at home. A person new to NECC told me that she "followed the crowds" because there were so many choices and so little information.

The second investigation involved observing changes in behavior patterns. I postulated that because less content was provided for decision making, there would be increased mobility during sessions as people tried to take in multiple sessions simultaneously. I also predicted that more people would be taking copious notes during the sessions because no text was available for embellishment. Both hypotheses seemed to be on target. With the shift in delivery medium, the message became inaccessible, which precluded text-supported sessions and obscured meaningful information needed to make educated attendance decisions.

## NECC '96 CD-ROM Proceedings

The conference ended. Back at my workstation anticipating the denouement, I popped the NECC '96 CD into its drive. Yes, it runs "plug in and go" in Windows '95. There is no cover screen, only a front page search engine. The search categories are: Author Name, Session Title, Subject, and Containing Text. When an article is called up, the system first loads Adobe Acrobat and then the article in question. The tiny font size of the PDF document makes on-screen reading difficult. (See Fornshell, 1995–1996, for an explanation of Acrobat and PDF files.) Articles may be printed on paper from the Acrobat menu. Alternately, articles may be harvested, stored in a digital tote bag, and printed from there. To access a second article, one must return to the search engine, make the selection process, wait for the reader and the article to load, print the article, and so on. If there is a list of articles in the larger box and a new name is typed into the author box, the article appears. The solution is to quit and start again.

Stephen Sesko (1996) presented on hypertext and told the audience that an abstract of his remarks was in the proceedings. In the Containing Text box, I typed the word "hypertext." After a somewhat lengthy wait, the system responded, "Nothing found. Try a different search." I retyped the descriptor three times and tried changing the case but got the same "nothing found" message each time. Typing "hypertext" in the Subject box brought a shrill tone. Extending the list revealed that "hypertext" was not on the list. Typing Sesko in the Author name returned the same shrill tone. Using the down arrow in the Author name box located Stephen Sesko and his abstract. The word "hypertext" appears twice in the abstract title; it is the first keyword listed, and although it appears several times in the text, "hypertext" is neither a subject nor a text word in the search engine.

## NECC '96 Paper Proceedings

Littman (1996), an author, lent me her paper proceedings. The word "hypertext" is in the index with the page reference, 338. On that page is Sesko's (1996) abstract. At the front of the book is an alphabetized table of contents. At the back, is a comprehensive index with many more descriptors than appear on the CD scroll-down listings. I needed to access three e-mail addresses. Using the book, it took less than one minute each. Using the CD ... I didn't even try. Comparing the "A" keywords under Subject on the CD with the entries in the print version revealed that the following keywords appeared in the print version only: accreditation, achievement, animation, assistive technology, asynchronous learning, and authoring, to name only a few. I called ISTE and ordered a paper copy of the NECC '96 Proceedings.

## The Medium and the Message

As a long-time advocate of CD-ROM technology and its multiple roles in the learning process, I did not expect to be disappointed with this one. Similarly, it is not my intention to denigrate the product. Rather, I want to raise the issue of the medium and the message. Until I borrowed the paper copy and learned otherwise, I assumed that all content was identical in both formats. The following list contains some questions to start your exploration of the greater issues of medium and message and, I hope, to inspire reader contributions to a debate:

1. Why is this the delivery medium of choice for the task on hand?
2. Why is this medium better than the old way?
3. How will the new technology operate in the projected setting?
4. What will be lost in the transition from the old to the new?
5. What new attributes can the new media add to the learning process?
6. What are the affective benefits of the new technology approach?
7. What are the cognitive benefits of the new technology approach?
8. List the costs involved in implementing the new technology in terms of hardware and software acquisition installation and maintenance, heating and cooling furnishings, teacher training in the use of the technologies, teacher time for curriculum revision, implementation, dissemination, evaluation, revision, and so on.
9. All things considered, shall we move to the new technology at this time?

## Conclusion

Occasionally, a graduate student will ask whether I am really disappointed with a technology application or I am just trying to instigate heated responses. The answer is, "Does it really matter?" Let us hear from you—that matters.

## References

Fornshell, G. (1995–1996). Adobe Acrobat: The universal electronic publishing tool. *HyperNexus, 6*(1/2), 21–23.

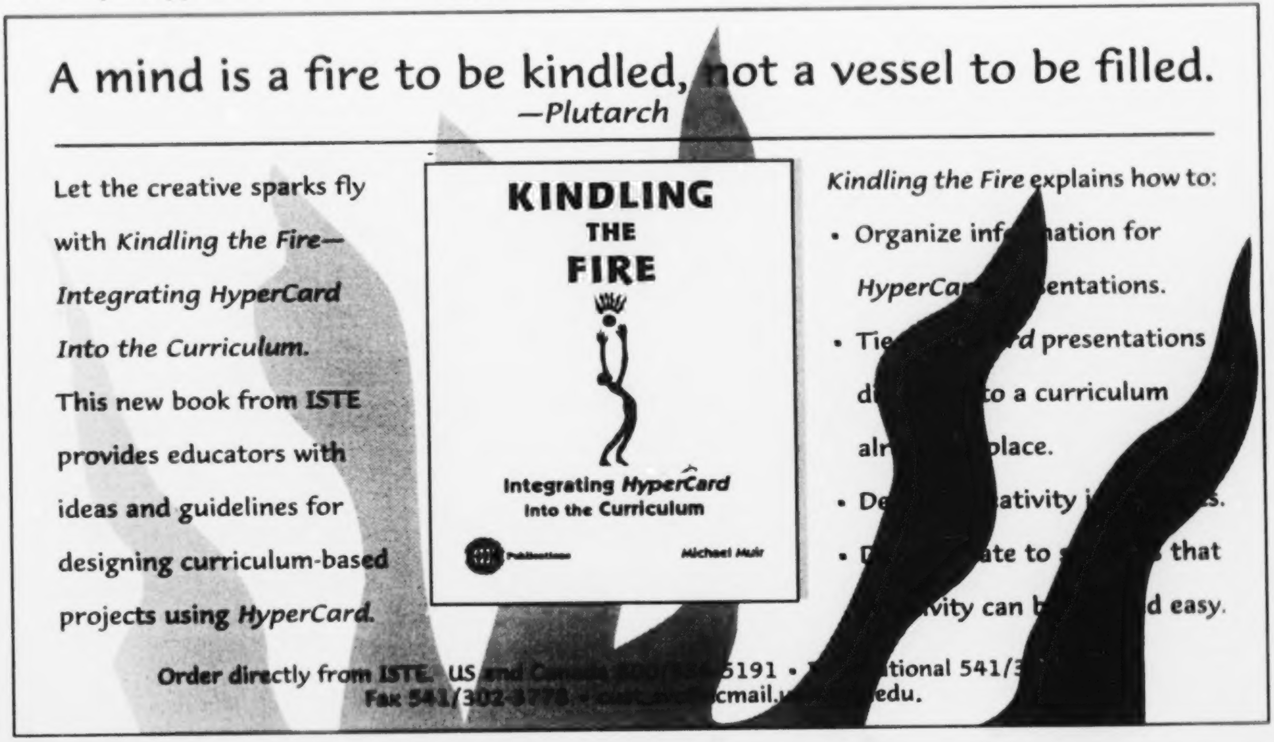
Littman, M. (1996). A managerial analysis of ATM in facilitating distance education. In D. Ingham (Ed.), *Proceedings of NECC '96* (pp. 227–234). Eugene, OR: International Society for Technology in Education.

McLuhan, M., & Fiore, Q. (1967). *The medium is the massage: An inventory of effects.* New York: Bantam Books.

McLuhan, M. (1964). *Understanding media: The extensions of man.* New York: New American Library.

Sesko, S. (1996). Cutting the hype on hypertext: Different educational hypertext environments. In D. Ingham (Ed.), *Proceedings of NECC '96* (p. 338). Eugene, OR: International Society for Technology in Education.

*Dr.* ***Trudy Abramson****, Nova Southeastern University, School of Computer and Information Sciences, 3100 SW 9 Avenue, 5th Floor, Fort Lauderdale, FL 33315; abramson@scis.nova.edu.*



A mind is a fire to be kindled, not a vessel to be filled.
*—Plutarch*

Let the creative sparks fly with *Kindling the Fire—Integrating HyperCard Into the Curriculum.* This new book from **ISTE** provides educators with ideas and guidelines for designing curriculum-based projects using *HyperCard.*

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- De[illegible]ativity [illegible]s.
- D[illegible]ate to [illegible] that [illegible]vity can b[illegible]d easy.

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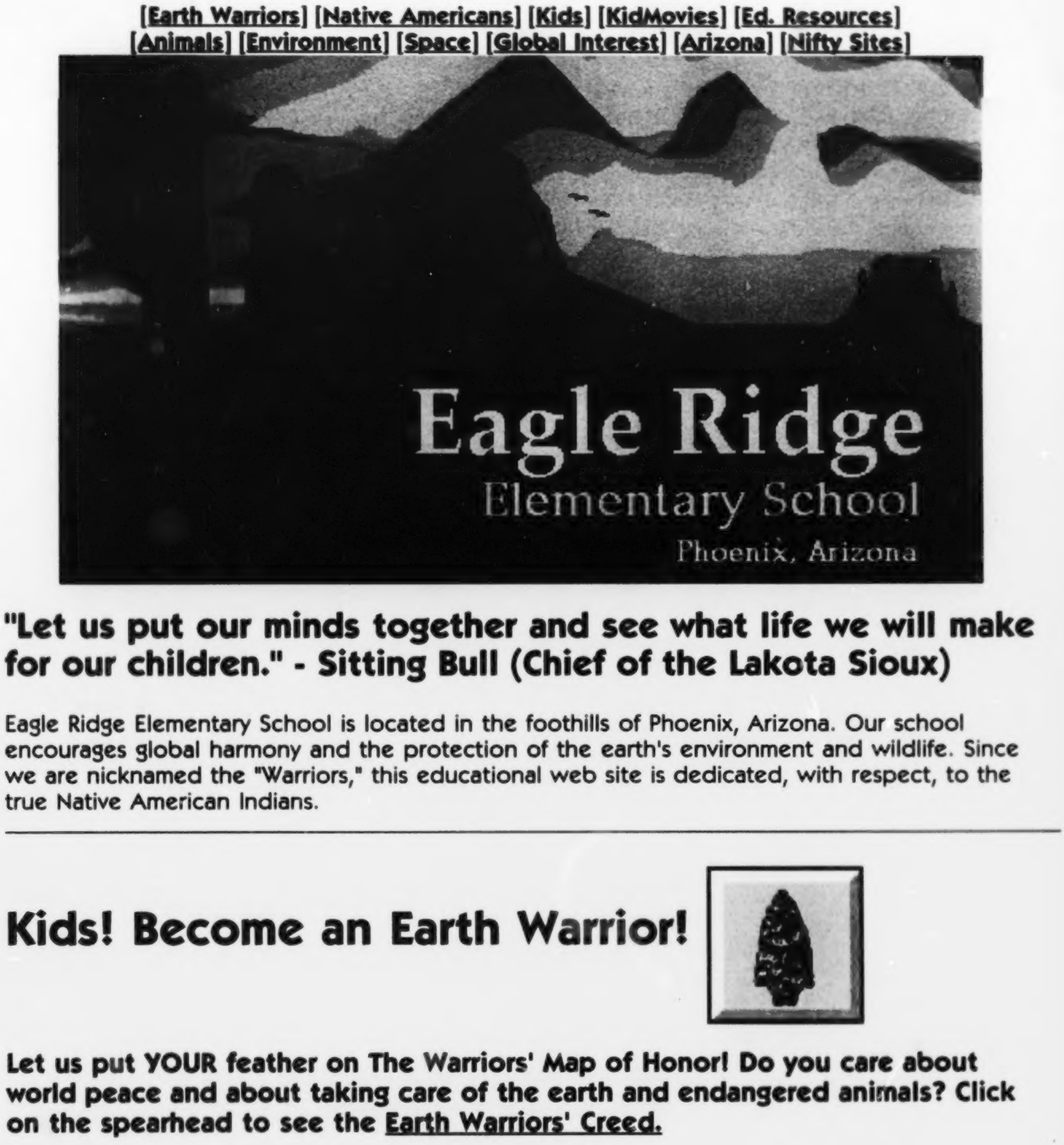
# ■ Exemplary Web Site

*Linn Boswell*

## Eagle Ridge Elementary School



[Earth Warriors] [Native Americans] [Kids] [KidMovies] [Ed. Resources]
[Animals] [Environment] [Space] [Global Interest] [Arizona] [Nifty Sites]

**"Let us put our minds together and see what life we will make for our children." - Sitting Bull (Chief of the Lakota Sioux)**

Eagle Ridge Elementary School is located in the foothills of Phoenix, Arizona. Our school encourages global harmony and the protection of the earth's environment and wildlife. Since we are nicknamed the "Warriors," this educational web site is dedicated, with respect, to the true Native American Indians.

**Kids! Become an Earth Warrior!**

**Let us put YOUR feather on The Warriors' Map of Honor! Do you care about world peace and about taking care of the earth and endangered animals? Click on the spearhead to see the Earth Warriors' Creed.**

## Native American Indian Sites:

- **Native Tech** - Beautiful images demonstrating the importance of Native American art and technology.
- **The Lakota Home Page** - Scholarly information about the Lakota Sioux nation.
- **SkyDancer's Home Page** - Many links relating to Indigenous Peoples including links to First Nations.
- **Oneida Indian Nation** - Native American resources including the fascinating Oneida Indian language project.
- **Myths & Legends of the Indigenous Peoples** - Submitted by youngsters from around the world.
- **The Legend of Running Deer** - The story of how Running Deer made the rivers run.
- **American Indian Nations** - Information about the original Americans.
- **South Dakota Sioux Nation** - About South Dakota and the great Sioux Nation.
- **Native American Tribes** - Information about "The People" of America.
- **Pueblo Cultural Center** - Art, life and culture of the Pueblos.
- **The Heard Museum** - Visit a fine Native American museum located in Phoenix, Arizona.
- **American Historical Images** - Fantastic captioned photo gallery of the turn-of-the-century West.
- **Native American Art and Crafts** - Info and beautiful images of art, pottery, and weavings.

## Great Places For Kids to Visit:

- **G-G-G-G-Goosebumps!** - Caution! Watch out! Eeeiioow!
- **Yahooligans!** - A special site just for kids from the folks at Yahoo.
- **Ingenius!** - Offers great learning experiences for kids at home and school.
- **Dodo Land** - A fun, imaginative world with games, songs and stories.
- **String Figures and Designs** - Learn how to make string figures from around the world.
- **Interesting Places For Kids** - Hundreds of links for kids and families.
- **KidWatch** - Created by a large ad agency. A fun place where kids can participate.
- **Internet For Kids** - See the Squirrel Cam and add some lines to a never ending story.
- **Crayola's Page** - Get historical information about crayons and see how they're made.
- **The Ultimate Children's Page** - A zillion (Count 'em!) sites for children.
- **Mr. Rogers' Neighborhood** - Songs, activities and fun from the TV series.
- **Theodore Tug Boat Activity Center** - Lots of fun things from Canada for tiny tots.
- **Beakman's World** - Beakman can teach you about things your teachers wouldn't touch.
- **Kids' Space** - Find keypals, look at kid art, listen to global music, lots more.
- **GeoNet Geography Game** - An online geography game based on the new national geography standards.
- **Tales of Wonder** - A collection of folk and fairy tales from different countries (Russia, China, etc.)
- **Online Children's Stories** - Classics, fairy tales and folklore from around the world.
- **Dole Food's 5-A-Day Site** - Excellent nutrition information presented in a fun, clever manner.
- **Aunt Annie's Craft Page** - Make stickers, decorations and other art projects.
- **Global Show-n-Tell** - Hang your best work on this virtual refrigerator door.
- **Games Kids Play** - Learn the rules for old favorites like marbles, red rover, steal the bacon...

- **Kids Window** - Learn how to write in Japanese and make origami projects.
- **KidSafety** - Covers almost 30 different safety topics in a fun and colorful way.
- **KidsCom Activities for Kids** - Exciting games and interactive activities. Safe place for kids to chat.
- **Uncle Bob's Kids Page** - Outstanding, categorized collection of sites for kids.
- **Bluedog can count!** - This cute little guy can subtract, too!
- **World's 1st Dino Skeleton** - Photos and information about a hadrosaurus found in Pennsylvania.
- **The Museum of Paleontology** - Dinosaurs galore!
- **Exploratorium Home Page** - A wonderful museum for creativity in San Francisco.
- **KidPub WWW Publishing** - A place where kids can publish their own poems and stories.
- **Gopher Sites for Kids** - Files for kids and teachers to download or look at.
- **CyberKids Home Page** - Cool place to see stories and pictures made by kids around the globe.

## Movies For Kids:

- **Babe** - Production information and pictures of that one-of-a-kind pig.
- **Disney's Home Page** - Online magic from Disney. Preview new movies and attractions. A castle-full of fun.
- **James and the Giant Peach** - Cool stuff about Disney's latest movie.
- **Muppet Treasure Island** - Join the Muppets online for some fun and adventure.
- **Toy Story** - All about Disney's fully computer animated movie.
- **Pocahontas** - Pictures, games and information.
- **The Lion King** - Super images to look at, read about and download.
- **The Indian In The Cupboard** - Check out the latest from Paramount Pictures.

## Educational Resources for Teachers and Parents:

- **Time Magazine For Kids** - Nice kids' e-zine with current events and more.
- **Family Surfboard** - The Bennet family has put together a very fine, fun, educational site for you.
- **Acceptable Use Policies** - Extensive samples and information about AUPs.
- **AskERIC Resources** - Another place for educational data and resources such as Newton's Apple.
- **Latitude 28 Schoolhouse** - Great ideas for teachers and students. Includes a large listing of schools on the net.
- **The Incredible Art Department** - The complete resource for students and teachers of the visual arts.
- **ERIC (Ed. Resources Information Center)** - "The best educational resource on the Internet."
- **Classroom Connect** - Excellent newsletter with a wealth of online resources.
- **Global SchoolNet Foundation** - Curriculum projects, keypals, and educational articles.
- **Online Educator** - An online magazine for teachers. Checkout the free lesson plans and links.
- **Elementary Science This Month** - An very good online educational science magazine.
- **Natl. Parent Information Network** - ERIC resources for parents and educators.
- **Explorer Online Curriculum Projects** - Database of resources, lesson plans, projects, etc.

- **NASA's K-12 Internet Initiative** - To provide support for the Internet as a tool for learning.
- **The Internet Public Library** - Explore the world of books with Bookie. Great book reviews from kids.
- **The Virtual Reference Desk** - Dictionaries, thesauri, maps, travel info, other reference sources.
- **EdWeb** - Topics related to education reform and information technology.
- **Yahoo - K12 Educational Web Sites** - Vast listing of educational sites.
- **Planet Earth Home Page** - Huge library of www information and resources.
- **Apple Computer Virtual Campus** - A large array of information technologies for higher ed.
- **World Wide Web Virtual Library** - Topical listing of information from Sturt Univ. in Australia.
- **World Fact Book 1995** - Get information and a map of almost any country in the world.
- **The Library of Congress** - Access ERIC and other information resources.
- **Lesson Plans and other Resources** - Gopher site for downloading educational resources.
- **WWW Lesson Plans** - WWW site for downloading lesson plans. Includes AskERIC files.
- **Vose School** - Extensive educational resources categorized by educational topic.
- **Web66 K12 Schools on the WWW** - A global registery of schools.
- **Sonoran Sky Elementary School** - Another friendly web site from our school district.

## Animal Kingdom:

- **Desert Moon's Wolf Page** **Greywolf's Wolf Resource Page** - Two of Amani's friends.
- **ZooNet** - Start here if you want to learn about zoos.
- **Jason's Snakes and Reptiles** - Fascinating and comprehensive site maintained by a 14 year old student.
- **Bat Conservation International** - eek!
- **Frog Disection** - No formaldehyde needed. It's all online with photos and animations.
- **Cockroaches!** - And you thought snakes, bats and frogs were icky?
- **Five Tigers** - Lots of photos and information about the 5 different tiger subspecies.
- **National Wildlife Federation** - Has a kids section with Ranger Rick and many other great resources.
- **The Raptor Center** - These raptors are eagles, falcons, vultures, etc. - not dinosaurs.
- **Birding Exhibits** - Many beautiful photos of birds from around the world.
- **Sea World** - Learn about whales, sharks, turtles, etc.
- **Endangered Animals** - Please help protect them.
- **The Electronic Zoo** - Name an animal. You'll find it here.
- **Rhinos, Tigers and Bears** - See how animals are cared for at this zoo in Tennessee.
- **Fish FAQ (Frequently Asked Questions)** - There's something mighty fishy going on here!
- **Sharks!** - Just when you thought it was safe to go web surfing.
- **Wonderful Wombats** - Everything you ever wanted to know about wombats.
- **'Extinct' Potoroo rediscovered after 125 years.** - He's baaaaaack!

### Ecology and the Environment:

- **Great Outdoor Recreation Page (GORP)** - Things to do when your computer crashes - like camp, hike, fish...
- **The Tele-Garden** - This tele-robotic site lets visitors plant, water and view a garden.
- **Rainforest Action Network** - Facts, statistics, tips and a special Kid's Corner.
- **Environmental and Wildlife organizations** - Mailing list of many caring organizations.
- **The Grand Canyon** - Virtually visit one of the earth's greatest wonders.
- **Weather Information Superhighway** - Vast collection of weather data; info and images from around the globe.
- **National Science Foundation World Wide Web** - Trends, news and science education.
- **National Oceanic and Atmospheric Administration** - Govt info/research about marine and weather concerns.
- **Welcome to EE-Link** - Classroom activities, projects, grants and regional information.
- **Australian Environmental Resources Information Network** - Categorized air, land, life, marine links.
- **The EnviroWeb** - Online source with many types of environmental information.
- **Matt's Solar Car Page** - Check out these environmentally correct modes of transportation.

### Astronomy and Space:

- **Comets!** - This site is loaded with information about Comets. See images of all the big ones.
- **Hubble Telescope's Greatest Hits** - Beautiful up-to-date images of space.
- **Liftoff to Space Exploration** - Great place to start exploring all that NASA offers.
- **Welcome to the Planets** - Some of the best from NASA's planetary exploration program.
- **The StarChild Project** - NASA explains astronomy using images and videos.
- **The Nine Planets Tour** - Each of the planets is described and illustrated with hundreds of pictures.
- **Views Of The Solar System** - Extensive data with photos and animations.
- **Apollo 11 Home Page** - Information and photos of the first moon landing.
- **Comet Shoemaker-Levy 9 Impact** - Beautiful images of the largest planet getting hit by a comet.

### Across The Globe:

- **Around The World In 80 Clicks** - Visit places around the world by clicking on a large map.
- **BlueIce** - Photos, interviews, and info about Antarctica.
- **Maya Quest** - Travel by bike through Maya country.
- **Canadian Kids Page** - This super site proves that educating children is a worldwide concern.
- **World Art Treasures** -Timeless beauty from around the world - temples, portraits, images, etc.
- **The WebMuseum** - Famous paintings and art information from around the world.
- **Cave Paintings from France** - See prehistoric cave drawings done by our early ancestors.

- **The Carter Center** - Projects for peace and the elimination of disease, hunger, and poverty.
- **The JASON Project** - Volcanoes, oceanography, undersea shipwrecks, more adventure.
- **The Virtual Tourist - World** - Directory of www servers around the world.
- **Kobe, Japan's Earthquake Page** - The devistating Hanshin Earthquake, 7.2 Richter Scale.
- **Rescue Operations in Oklahoma City** - Shows what happened and gives a list of casualties.
- **Greek Mythology** - Stories and mini reports about each of the major and minor gods.
- **Medieval Reenactment Page** - Text and images announcing the glorious days of King Arthur.
- **ArchNet** - Virtual Library of Archaeology from the U. of Connecticut.
- **A Color Tour of Egypt** - Images and descriptions of the major Egyptian sites.
- **Pyramids** - Huge tall things with pointed tops that are found in the deserts of Egypt.
- **Earth Viewer** - Visit our big blue planet from any angle.

## The Great State of Arizona:

- **Current Weather in Phoenix** - An up-to-date four day weather forecast. Check your city, too.
- **The Grand Canyon** - Don't miss this beautiful site in northern Arizona.
- **Arizona WebHub** - A wealth of information about Arizona.
- **ArizonaWeb** - More information about Phoenix and Arizona.
- **Phoenix at Your Fingertips** - Lots of information about the nation's 7th largest city.
- **The Phoenix Zoo** - General information about this fantastic zoo.
- **Phoenix Suns Home Court** - Schedules, rosters, images of the Suns basketball team.
- **Arizona Cardinals** - Lots of information about Arizona's professional football team.

## Other Nifty Sites:

- **The Maze Man** - Gobs of educational and recreational puzzles from John Knoderer.
- **Optical Illusions** - More than 17 online classic optical illusions.
- **The Comics!** - Collection of newspaper comics such as Peanuts, Nancy, Dilbert, etc.
- **The NFL for Kids** - Pictures and information about the National Football League teams.
- **ESPNET SportsZone** - Scores, stats and more.
- **The White House** - Visit President Clinton and his family (including Socks The Cat).
- **The Smithsonian Institution** - See the wonders of our national heritage.
- **Smithsonian Gem & Mineral Collection** - Don't miss the last image in the list!
- **Yahoo's Home Page** - No web site would be complete without this important link.
- **The USA CityLink Project** - Explore the USA without kids quarreling in the back seat.
- **Vern's SIRDS Gallery (3D stereograms)** - Don't forget what Mom said about crossing your eyes.

---

Mr. Linn Boswell (Silent Wolf)
Eagle Ridge Elementary School
Paradise Valley Unified School District
19801 N. 13th Street
Phoenix, AZ 85024

[Earth Warriors] [Native Americans] [Kids] [KidMovies] [Ed. Resources]

# Case Study Review of MayaQuest: The Mystery Trail

*Bryce Bernard*

**Developer:** MECC
**Copyright Date:** 1995
**Subject:** History, Geography, and Archeology
**Grade Level:** 4–12
**Domain:** School or home
**Classification:** Simulation, Game
**Cost:** $49.95
**Hardware Requirements:**
IBM Compatible—486 processor or higher, Windows 3.1 or 95, 256 color SVGA, 4Mb RAM, 2X CD-ROM, minimum 2Mb on hard disk, mouse, sound card, printer
Macintosh—MAC LC III or higher, System 7.1 or higher, 5Mb RAM, 256 color monitor, 2X CD-ROM, minimum 2Mb on hard disk, mouse, sound card, printer

MayaQuest—The Mystery Trail is a wonderful example of how computer technologies can be used to enhance the learning process. This application uses a combination of technologies and learning theories to challenge students. MayaQuest places the student in Central America as an explorer of the ancient Mayan Indian civilization. The microworld of Mayan ruins provides a background for the development of decision making and research skills as well as historical, geographical, and cultural literacy.

MayaQuest provides students and teachers with six major avenues of learning. The CD-ROM application can be used as a stand-alone program or in conjunction with the World Wide Web site sponsored by MECC. The CD-ROM provides four paths to students:

- An adventure game.
- An exploration mode.
- An opportunity to read real explorers personal journals.
- A Multimedia Resource Tool to build a presentation of their own.

The adventure game challenges students to locate Mayan artifacts among the ruins in various cities. An artifact is presented along with clues for finding the location, much like the popular Carmen SanDiego series. The student then makes a decision to travel to and search a specific location. Unlike the Carmen SanDiego series, where the user is transported to the location, MayaQuest requires the user to navigate dirt roads, pot holes, and fallen trees on a bicycle. This feature brings an arcade-game look and feel to the adventure. Students playing the adventure game were often found timing each other as they raced to the next location. The user explores the ruins on foot in a limited virtual-reality-type mode. This simulation was easy to learn. When incorrect decisions were made about locations, the system provided additional prompting to guide the user. Seven- and ten-year-old boys quickly experienced success without instruction from an adult.

The exploration module allows the user to freely roam the Central American landscape and explore the ruins without the time constraints and game action of the adventure module. Figure 1 shows a map of the area involved. This mode is especially useful when combined with the World Wide Web resources.

*Figure 1.*

The journal module allows users to scroll through selections from explorers' and archaeologists' personal journals. The content here tends to be more in depth and focuses specifically on historical, cultural, geographical, and archeological concepts.

MayaQuest also provides the students with a Multimedia Resource Tool, which allows them to create a simulation using images, text, video and sound clips. Every clip used on the CD-ROM is available to the student. Younger users may need assistance in using this resource, simply because of the volume of data available.

The World Wide Web site provides two additional learning opportunities for students. It encourages collaboration with other students around the world by providing message forums. Students can interact with each other. Teachers and parents can direct the process by helping students formulate questions for other users or answering questions posed by others.

The Web site (see Figure 2) is also the platform for communicating with an actual team of explorers on bicycles in Central America. In 1995, a MayaQuest team traveled the Mayan ruins on bicycle. Students from around the world guided the expedition by posing questions to the team, who were linked by laptop computers to the Web site. Over one million people joined the team and viewed 22,332 pictures from 30 archeological sites. Another trip also took place in spring 1996. Figure 3 shows the team's campsite. Students will be able to chat with the team and see new pictures of the team's travels. The MayaQuest application is much more than a computer learning game. It is a comprehensive learning system. It combines the traditional reading of books, viewing of pictures and movies, and teaching by the instructor with active participation, collaboration, and student-directed pacing. The MayaQuest system provides a wealth of resources to the student and teacher. The application and resources address multiple learning styles and provide something exciting for most users. Their strength lies in their ability to hold the user's attention and to encourage students into deeper exploration.

MayaQuest does not provide management functions. It will not track student progress or provide reports based on what the student has done to assist teachers in directing the learning process. The instructors' manuals are available separately for $85. The instructors printed resources are well organized and provide a variety of lesson plans that can be used in many teaching situations. The instructors' resources also contain a more traditional users manual. The resources are a good investment for the teacher or parent. In the Spring, 1996, edition, teachers will be able to collaborate on lesson plans and projects on the MayaQuest Web site. Use of the Internet site does require additional training and resources for both the student and the teacher.

The CD-ROM program comes with only a small booklet of installation instructions and general background information. The system does not have a formal, context-sensitive help system like a word processor usually does. MayaQuest is constructed with a tutor-type help system that senses the users need. Students did not read even the minimal instructions, nor did they need to in order to use the CD. Teachers could be frustrated by the lack of an searchable online help system.

MayaQuest is a learning tool that has set the standard for the use of computer technologies in the classroom. The variety of learning modes and resources will enhance the teaching and learning process.

***Bryce Bernard**, MBA, CPA, is Associate Dean of Academics at Western Baptist College, Salem, OR 97301.*

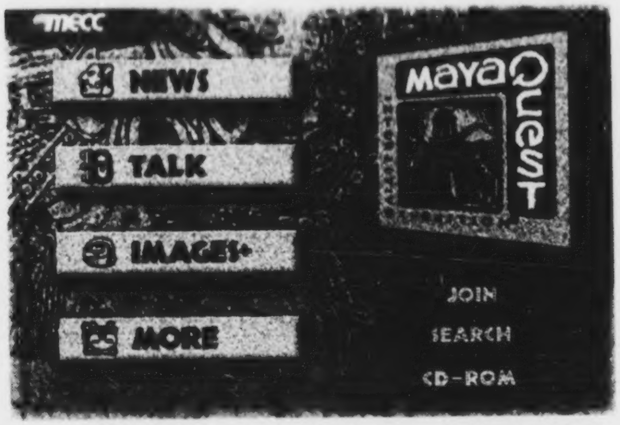


*Figure 2. The MayaQuest home page (http://www.mecc.com/mayaquest.html)*

*Figure 3.*

# New Technology: BOOK

*Editor's Note:* The article that follows was forwarded to me by Steven E. Poris [poris@prodigy.com] as posted by Don E. Descy [descy@vax1.mankato.musu.edu] on the AECT Issues Discussion Group listserv. Don got it from Ralph Ramhoff [IN%rramhoff@bna.com] who posted it to NETTRAIN, a listserv. Ralph got it from Gerri Gray [tech_talk@loyola.edu]. The 1962 part comes from a magazine called *Punch*; the "Boss's response" is anonymous. If a reader is able to provide specific information as to the authors of this very funny (and maybe not so funny) commentary, *HyperNexus* would be pleased to publish it.

## For your amusement ... from *PUNCH*, about 1962

A new aid to rapid—almost magical—learning has made its appearance.

Indications are that if it catches on all the electronic gadgets will be so much junk.

The new device is known as Built-in Orderly Organized Knowledge. The makers generally call it by its initials, BOOK™.

Many advantages are claimed over the old-style learning and teaching aids on which most people are brought up nowadays. It has no wires, no electrical circuit to break down. No connection is needed to an electrical power point. It is made entirely without mechanical parts to go wrong or need replacement.

Anyone can use BOOK, even children, and it fits comfortably into the hands. It can be conveniently used sitting in an armchair by the fire.

How does this revolutionary, unbelievably easy invention work?

Basically, BOOK consists only of a large number of paper sheets. These may run to hundreds when BOOK covers a lengthy program of information. Each sheet bears a number in sequence, so that the sheets cannot be used in the wrong order.

To make it even easier for the user to keep the sheets in the proper order they are held firmly in place by a special locking device called a "binding."

Each sheet of paper presents the user with an information sequence in the form of symbols, which he or she absorbs optically for automatic registration on the brain. When one sheet has been assimilated a flick of the finger turns it over and further information is found on the other side. By using both sides of each sheet in this way a great economy is effected, thus reducing both the size and cost of BOOK. No buttons need to be pressed to move from one sheet to another, to open or close BOOK, or to start it working.

BOOK may be taken up at any time and used by merely opening it. Instantly it is ready for use. Nothing has to be connected or switched on. The user may turn at will to any sheet, going backwards or forwards as he or she pleases. A sheet is provided near the beginning as a location finder for any required information sequence.

A small accessory, available at trifling extra cost, is the BOOKmark. This enables the user to pick up his programme where he left off in the previous learning session. BOOKmark is versatile and may be used in any BOOK.

The initial cost varies with the size and subject matter. Already a vast range of BOOKs are available, covering every conceivable subject and adjusted to different levels of aptitude. One BOOK, small enough to be held in the hands, may contain an entire learning schedule.

Once purchased, BOOK requires no further upkeep cost; no batteries or wires are needed, because the motive power, thanks to an ingenious device patented by the makers, is supplied by the brain of the user.

BOOKs may be stored on handy shelves and, for ease of reference, the program schedule is normally indicated on the back of the binding.

Altogether the Built-in Orderly Organized Knowledge seems to have many advantages with no drawbacks. We predict a big future for it.

## A Boss's Response

BOOK does not, in spite of the claims, seem "to have great advantages with no drawbacks." Soon, it probably won't even be legal. Consider the following points.

"It can be conveniently used sitting in an armchair by the fire." Because it is paper, it might burn in the fire. Probably fire laws in most locations wouldn't allow its use there. Worse, such a device, which encourages close proximity of the user to fire, will probably be outlawed by OSHA.

"Each sheet bears a number in sequence, so that the sheets cannot be used in the wrong order." How quaint; to think that the programmer (author) would be allowed to turn over such an important task to the user! "Cannot" is clearly misused; any user could incorrectly turn to the wrong page. A proper user interface might correct that, of course, such as requiring that each sheet be torn off to expose the next. This is, however, in clear conflict with "The user may turn at will to any sheet, going backwards or forwards as he or she pleases."

"BOOKs may be stored on handy shelves and for ease of reference." The user interface obviously needs more work before such a system can be practical.

"The motive power ... is supplied by the brain of the user." Clearly, the inventors have not examined recent trends. No serious person would suggest even expecting a "user" to have a brain present, much less to use it so continuously.

I'd suggest the inventors return to their consoles and do a thorough associative search of various data banks, like the rest of us, and forget this nonsense.

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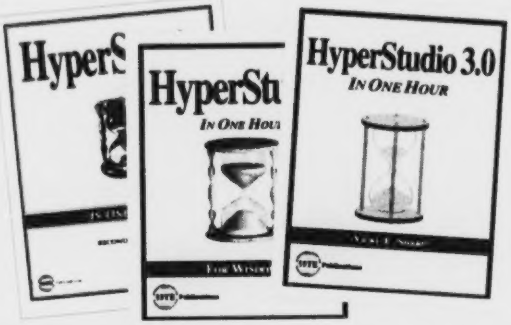

Think that your HyperStudio program is just too hot to handle? Well, drop your mitts, because we've got three HyperStudio instruction books that will really take the heat off.

With Vicki Sharp's *HyperStudio in One Hour,* you'll be cooking in comfort before you know it. Sample projects and step-by-step instructions written in conjunction with the latest developments by HyperStudio creator Roger Wagner take the sweat out of creating a four-card stack. Each card you create builds on the skills you've learned, making it easy to exploit the flexible, nonsequential nature of this exciting learning tool.

Ignite your creativity and that of your students with the power and originality of multimedia. Combine text and graphics, link ideas, fire up the audio, and then set your projects aflame with movies, animation, and color. Blaze new trails with this versatile instrument for collecting and comparing information, presenting research results, recording data, and expressing complex thoughts.

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Two double-spaced hard copies of manuscripts with screen dumps and an ascii file (noting platform and wordprocessor used) should be sent by land mail. Include your name, address, phone, and e-mail address. Receipt of manuscripts will be acknowledged electronically.

Send manuscript package to the editor:
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# HyperNexus

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International Society for Technology in Education

**Editor-in-Chief**
Gertrude (Trudy) W. Abramson, EdD
School of Computer and Information Sciences
Nova Southeastern University
954/423-1211
abramson@scis.nova.edu

**Contributing Editors**
George K. Fornshell, PhD
School of Computer and Information Sciences
Nova Southeastern University
gforn@scis.nova.edu

Marlyn Kemper Littman, PhD
School of Computer and Information Sciences
Nova Southeastern University
marlyn@scis.nova.edu

Paola Williams
Punahou School
Honolulu, HI
pwilliam@lava.net

**Publications Coordinator**
Jennifer Roland, ISTE

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Caroline McCullen
*caroline_mccullen@ncsu.edu*

Susan Veccia
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# The Editor's Pulpit

*Trudy Abramson*

## Cyberspace Issues and More

### Across the Miles

We who work and play on the Internet quickly become acclimated to a world without space constraints. Communications across the globe are as easy as those across the corridor. At SCIS, the academic year contains two sixth month doctoral terms. Students spend several class-intensive days on campus and, when they return home, maintain contact with peers and faculty using a variety of online computer tools. This term, my students represent many states, Canada, Puerto Rico, and Japan. At times, I broadcast messages with a UNIX tool, ManyMail, which archives each message and recipient list until later, usually about 2 a.m., and then sends the message to the people on the specified list. Typically, about 36 hours pass before responses start coming in but, of late, the first response arrives from Japan, often by the next morning. You might imagine that two decades of Internet use might make me jaded, but it does not—the thrill lingers on.

### Across Time

Preparing this editorial requires another leap, this one across time. With the efficient production schedule currently in place at ISTE, I can reliably assume that *HyperNexus* will reach readers about three months after the submission date, about 14 weeks after the editorial is written, revised, and revised. To me, it is more difficult to travel ahead in time than it is to accept the immediacy of communication across the planet. It was with unparalleled excitement that I opened volume 6 number 4 and read, in my own column, "It is now August" and it was! Using my best guess and Jennifer Roland's excellent attention to procedure, you should be reading these words early in January 1997. That should give you time to polish your software projects and enter the *HyperNexus* contest promised in the previous issue. All submissions will be considered for publication in the journal.

### Opening a Dialogue on Web-Based Journals

In the previous issue, I raised the issue of Web-based publications. Upon consultation with the editorial board, it was decided to ask SIG members to contribute to an ongoing dialogue. Please formulate responses to the following questions (or make up your own and answer them). Contributions will be published in volume 7 number 4 at the discretion of the editorial board.

> What roles, if any, do you envision for Web-based journals? Will Web-based journals replace or supplement paper-based journals? What would you like to see online? Abstracts? Tables of Contents? Complete articles? Editorials?
>
> How do you read Web-based articles? [For example, I print them on paper and read from the printed page.]
>
> At this time, SIG membership covers the journal subscription fee. How would you feel about a fee for an online journal? Would you pay a membership fee if you could access the entire journal online free?
>
> If you are accessing the Web with a modem-based Internet connection, do you usually check the text-only option, where available, to accelerate the speed of transmission? Would you want the articles without the images?

We hope these questions will provoke some serious thoughts and responses. Please e-mail me at abramson@scis.nova.edu or mail your responses to me at the address on the inside back cover.

While on the subjects of the Web and contributions, we think it is high time to publish SIG actions and thoughts on Acceptable Use Policies for schools and classes that use the Internet. Let everyone know what is being done at your site.

### New Editorial Board Member

For more than two years, I have been searching for an editorial board through these pages and through personal networking. Members of the editorial board review submissions for the journal; solicit articles in specific areas of interest; review submissions for accuracy and reader interest; and make editorial notations requesting corrections, additions, deletions, and images. All ISTE SIG editorial work is volunteer; there are no honoraria involved. The awards (rewards, compensations) are the pleasures of seeing a job well done and the contributions to "best practice." Most members of ISTE editorial boards are precollege administrators or college faculty. Few K–12 teachers have the time or technology access to accept the positions—but their participation is always solicited. Today's academe is made up of fewer full-time faculty and more adjunct or part-time faculty. Teaching loads for faculty continue to increase making it very difficult to publish, let alone to edit.

*HyperNexus* would like to boast a sizable editorial board. Potential editors are asked to send professional vitas and writing samples to me (Trudy) at the address on the inside back cover. At this time, it gives me great pleasure to introduce our newest editor, and my next-door colleague, Marlyn.

**Marlyn Kemper Littman**, PhD, is a professor in the School of Computer and Information Sciences (SCIS) at Nova Southeastern University (NSU). She holds her PhD from NSU and masters degrees from the University of South Florida and Temple University. She is the author of numerous publications in the computer communications field. Marlyn's research interests include network security, ATM (asynchronous transfer mode) networks, and multimedia and virtual reality (VR). See her excellent VR articles in this issue and in volume 6 number 3. In her new role with *HyperNexus*, she will examine VR applications and developments from the perspective of the school and university setting and innovations in networking in the learning environment.

## HyperSIG Contest

At the June 1996 meeting of the SIG at NECC '96, the membership decided to sponsor a hypermedia/multimedia development contest and to demonstrate the winning software at NECC '97 in Seattle, Washington. The rules for participation are spelled out on the contest cover page on page 4. Feel free to photocopy and distribute the page widely; multiple submissions are acceptable, but each must have a separate cover sheet. You do not need to be a SIG member to apply or to win. Submissions must be postmarked by April 30, 1997, to allow time for viewing and judging.

Six award certificates with $100.00 honoraria will be given. Winners will be contacted by the end of May so that they may prepare their presentations. Paola Williams, SIGHyper Chair, and Trudy Abramson, *HyperNexus* Editor, will conduct the session. Although it is hoped that all winners will present their own work, the session chairs will present the work of winners who are unable to participate in NECC '97. Winning software will be featured in volume 8.

## In This Issue

This issue contains fewer articles than usual, but about the same number of pages. Each of the authors was urged to write as succinctly as possible but each had a message to share that could not be made shorter. Once again, I urge readers to send Letters to the Editor that will help guide the publications process. This is *your* journal and we want it to serve your needs in the best possible fashion.

In her message as SIGHyper Chair, **Paola Williams** extends a new-school-year invitation to all SIG members to share their expertise in *HyperNexus* and at NECC '97.

**Thomas E. Beutel** describes the process undertaken in the creation of multimedia courseware. Graphs and Networks is a product designed as a supplement to a college-level computer science course. The tools used in development include NeoBook Professional, Microsoft Quick BASIC, and graphic sites from the Web.

**Stephen C. Sesko, Theresa Nightswonger,** and **Stanley Lindberg**, working under a United States Department of Education grant, immersed themselves in a unique computer-based environment called "StorySpace" to develop and test innovative approaches to teaching and learning. This article was written at my request following the first author's project presentation at NECC '96.

**Marlyn K. Littman** (see the description earlier in this message) presents recent developments for simulation and interaction for Web-based virtual [reality] worlds. She includes URLs that enable readers to extend their knowledge bases beyond the information supplied herein.

In volume 7 number 1, we introduced **Caroline McCullen**, who provided the URL for her award-winning Web site, "Midlink Magazine." The current (at press time) issue is reproduced here to encourage visiting and writing for the actual site.

**Paola Williams'** ever-popular "Web Wanderings" column features Web resources for producing and designing HTML (HyperText Mark-up Language) documents. HTML is the code that turns data, images, and links into Web sites. Also find reference to Caroline's Web site, for which Paola is a contributing editor.

***Trudy Abramson***, *Nova Southeastern University, School of Computer and Information Sciences, 3100 Southwest 9th Avenue, Fort Lauderdale, FL 33315; 954/423-1211; abramson@scis.nova.edu*

# HyperNexus Interactive Software Contest

Name(s) ________________________________________________

School name and address ____________________________________

________________________________________________________

Day phone ____________________ Evening phone ____________________

E-mail ____________________________ http:// ____________________________

Check one category only
Student-developed software: ____ N–5 ____ 6–12 ____ post-secondary
Teacher-developed software: ____ N–5 ____ 6–12 ____ post-secondary

Product Title: ____________________________________________

Platform/OS/Authoring system ________________________________

Loading instructions or http:// ______________________________

________________________________________________________

Curriculum area, goal, & learning objectives ______________________

________________________________________________________

________________________________________________________

## Rules

1. Software may be constructed with any authoring system or programming language for use on Mac OS, Windows, DOS, or Internet.
2. Teacher-developed software should run at least one class, or 30 minutes.
3. Student-developed software has no time limits.
4. Members of the SIG board and *HyperNexus* editorial board may not participate.
5. Write product name and platform only on disks. If possible, send screen dumps.
6. Send two copies of each disk and two copies of cover page to Dr. Trudy Abramson, NSU/SCIS, 3100 SW 9 Avenue, Suite 522, Ft. Lauderdale, FL 33315. Entries must be postmarked no later than April 30, 1997.

## Judging Criteria

1. Does this product clearly present stated curriculum goals and objectives?
2. Are the spelling, sentence structure, punctuation, and grammar accurate?
3. Is the content coherent, accurate, and age-appropriate?
4. Is the product attractive, engaging, and instructional?
5. Is the user interface friendly and intuitive?

# Message From the Chair

Paola Williams

SIGHyper's mission is to support and promote educators involved in creating hypermedia or multimedia educational applications and programs. Under the auspices of the International Society for Technology in Education (ISTE), SIGHyper carries out its mission by collecting and disseminating information through its publication, *HyperNexus*. It also is an active participant in the NECC conferences. Its goal is to meet the needs of its membership by serving as the liaison between educators who create educational applications and programs in hypermedia and multimedia and ISTE and its other special interest groups.

As the Chair of SIGHyper, I invite you to participate in both the publishing of information and the presentation of your projects by submitting your work to *HyperNexus* and presenting at NECC '97. Think about the work you do in the classroom, at the university, and in your multimedia business. Share your triumphs, your failures, and your excitement about the activities that are going on in your special niche.

The convergence of multimedia and the World Wide Web have blurred divisions among many fields. Many of us have viewed ourselves as experts in one or the other. As technology combines and reconfigures at unimaginable speeds, we must combine talents and expertise to learn from each other.

As the school year unfolds, use *HyperNexus* as a guide for discovery. Share with your colleagues and promote the use of multimedia technology as an integral tool in learning.

Aloha,

***Paola Williams****, SIGHyper Chair, Punahou School, Honolulu, HI 96825; pwilliam@lava.net*

**Dear Readers,**

**Today is November 27, 1996. Jim Cornish, a technology coordinator and fifth-grade teacher from New Foundland, Canada, just called with an astute observation about volume 7 number 1. He reported that we did not include the URL for Linn Boswell's exemplary Web site. (Six lashes with a wet noodle for me and the same for Jennifer Roland!) The elusive URL is:**

**http://www.primenet.com/~eaglerg/**

***HyperNexus* thanks Jim for his contribution.**

**Trudy**

ISTE PUBLICATIONS

HYPERMEDIA HELP FROM ISTE!

MicroWorlds is a powerful hypermedia application that offers many of the appealing features seen in Kid Pix, HyperCard, and LogoWriter in a single program. This Version 2.0 edition is newly revised and includes all new screen shots. Learn to use MicroWorlds objects to control turtles and add text. Learn to integrate sound, music, audio CDs, LaserDiscs, and QuickTime movies into your computer-generated projects. Each chapter discusses problem solving in the MicroWorlds environment and includes tips on techniques, activities, and self-assessment. Appendices contain a list of all the Logo primitives available in MicroWorlds.

To order this book or receive the most recent *Resources & Services for Technology-Using Educators* guide, contact ISTE.

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Two, Two, Two Worlds in One!

# Developing Interactive, Dynamic Courseware: Authoring and Programming Team Up

*by Thomas E. Beutel*

Students often have difficulty understanding both the concepts and the implementation techniques related to abstract structures, processes, and operations. The problem is primarily one of visualization, not being able to "see" the structure or the result of various algorithms that manipulate a structure in some way. This problem has been recognized in several areas of study, particularly in the sciences, engineering, and mathematics (Aukstakalnis & Mott, 1996; Kaplan, 1992).

Graphs & Networks: Concepts & Implementation is a multimedia, interactive courseware application that is being developed to facilitate the learning of abstract data structures and algorithmic operations encountered in computer science. It is intended to be used by freshman or sophomore undergraduate computer science majors as a supplement to normal instruction. To facilitate development, an authoring tool, NeoBook Professional by NeoSoft Corporation, was used in conjunction with Microsoft's QuickBASIC programming language.

## First Things First

Development of any instructional materials, and particularly something as major as a courseware product, must begin with an understanding of the needs of the intended users, a definition of learning objectives, and an overall application structure. The need being met with the Graphs & Networks courseware is to facilitate learning of abstract structures and related operations by computer science students, as described previously.

Specific learning objectives, stated in terms of what the student should be able to do after using the courseware (Gagne, Briggs, & Wager, 1992) are described in the Introduction section of the courseware and listed in Table 1. Some details, such as specific terminology and concepts, have been omitted to simplify the presentation.

**Table 1.**
**Learning Objectives for Graphs & Networks Courseware**

1. The student will define the terms related to graphs and networks.
2. The student will explain the concepts related to graphs and networks.
3. The student will implement an adjacency matrix as a means of implementing a graph or network.
4. The student will implement common primitive operations for graphs and networks.
5. The student will implement additional operations for networks.
6. The student will apply graph and networks data structures and their associated algorithms to problems in transportation, communication, and other appropriate areas.

The courseware consists of five units relating to the topics of graphs, digraphs, and networks. Each unit has four main learning activities:

1. Tutorial.
2. Animated demonstration.
3. Interactive lab session.
4. Self-test.

Overall, the organization of these units is somewhat complex. To facilitate development of the courseware, the structure shown in Figure 1 was designed. The modular structure of the application allows development of individual parts independently. For example, elements of the first main unit, Graphs and Digraphs, were developed before any work was done on the other units.

The top-level box in Figure 1 represents the "front matter" of the courseware: the title screen, introduction, and contents page. The title screen identifies the

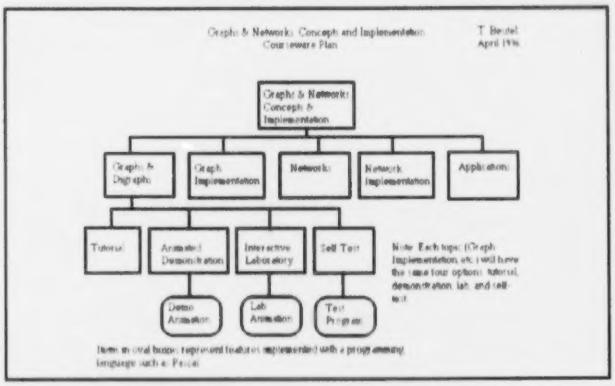
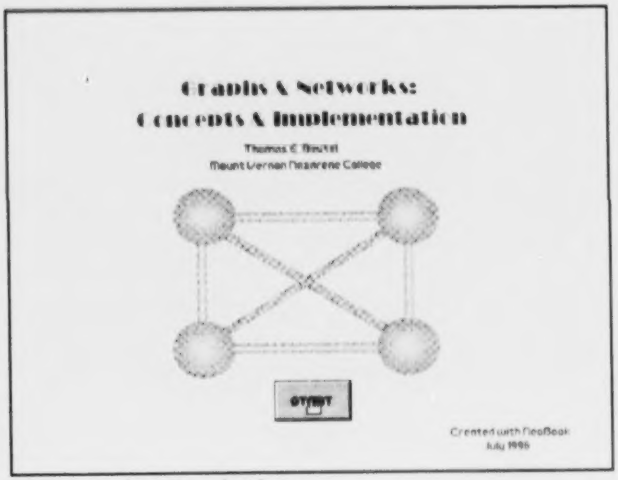

Graphs & Networks: Concepts and Implementation
Courseware Plan
T. Beutel
April 1996
Graphs & Networks: Concepts & Implementation
Graphs & Digraphs
Graph Implementation
Networks
Network Implementation
Applications
Tutorial
Animated Demonstration
Interactive Laboratory
Self Test
Demo Animation
Lab Animation
Test Program
Note: Each topic (Graph Implementation, etc.) will have the same four options: tutorial, demonstration, lab, and self-test.
Items in oval boxes represent features implemented with a programming language such as Pascal.

*Figure 1. Courseware structure*

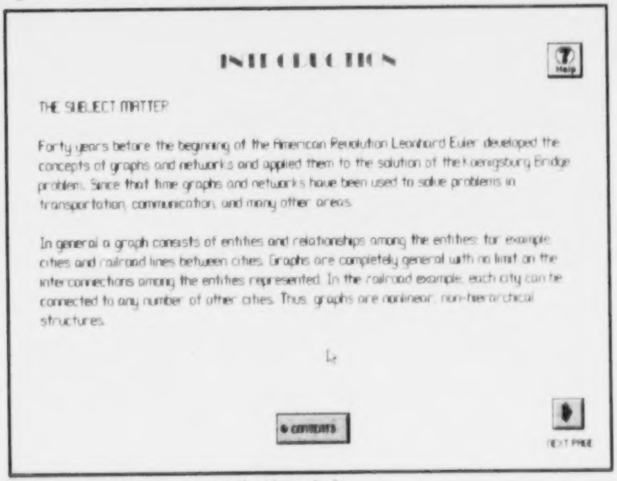


Graphs & Networks:
Concepts & Implementation

Thomas E. Beutel
Mount Vernon Nazarene College

Created with NeoBook
July 1996

*Figure 2. Graphs & Networks title screen*



INTRODUCTION

THE SUBJECT MATTER

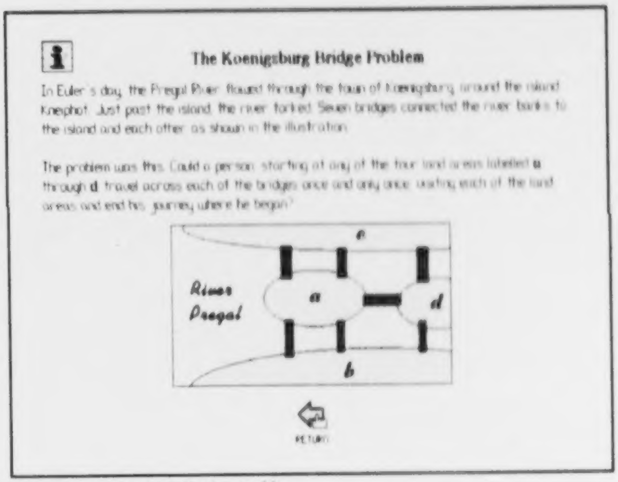
Forty years before the beginning of the American Revolution Leonhard Euler developed the concepts of graphs and networks and applied them to the solution of the Koenigsburg Bridge problem. Since that time graphs and networks have been used to solve problems in transportation, communication, and many other areas.

In general a graph consists of entities and relationships among the entities: for example cities and railroad lines between cities. Graphs are completely general with no limit on the interconnections among the entities represented. In the railroad example, each city can be connected to any number of other cities. Thus, graphs are nonlinear, non-hierarchical structures.

*Figure 3. Introduction page with a hyperlink*

courseware and emphasizes the content of the courseware by displaying a stylized picture of a graphical data structure. Figure 2 shows the title page.

After the user clicks on the **Start** button on the title screen, the first page of the introduction is displayed. The introduction describes the subject matter of the courseware, the courseware structure, the learning goals, and prerequisites. Hyperlinks are included in the introduction, as in other parts of the courseware, to allow the learner to explore supplementary information. Figure 3 shows a page of the introduction with a hyperlink to the Koenigsburg Bridge Problem. Selecting the link brings up the screen shown in Figure 4. The contents page lists the five main topics of the courseware as shown in Figure 5.

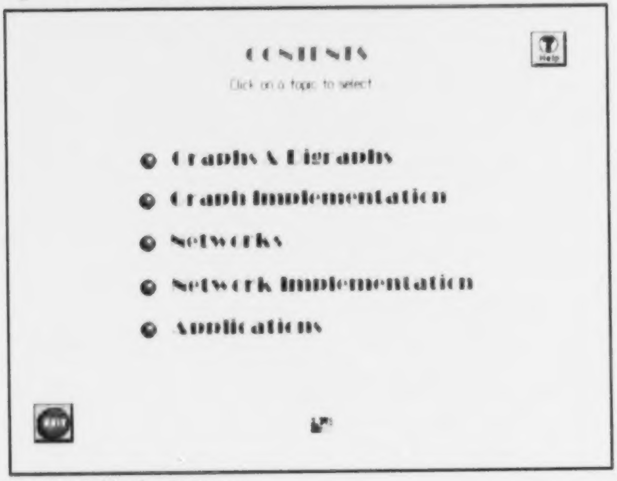


The Koenigsburg Bridge Problem

In Euler's day, the Pregel River flowed through the town of Koenigsburg around the island Kneiphof. Just past the island, the river forked. Seven bridges connected the river banks to the island and each other as shown in the illustration.

The problem was this. Could a person, starting at any of the four land areas labelled **a** through **d**, travel across each of the bridges once and only once, visiting each of the land areas and end his journey where he began?

*Figure 4. Koenigsburg bridge problem*



CONTENTS

Click on a topic to select

- Graphs & Digraphs
- Graph Implementation
- Networks
- Network Implementation
- Applications

*Figure 5. Table of contents page*

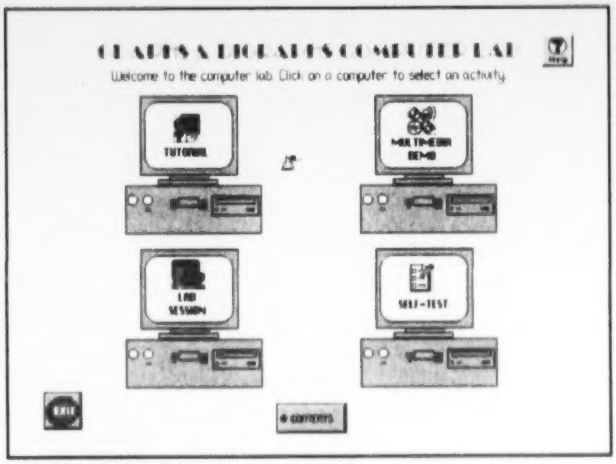
## Metaphors and Other Human Factors Considerations

Although the courseware structure provides the skeleton underlying the finished product, the flesh, or the visible part of the application, is what the learner will be dealing with. One important concern in designing the individual screens, controls, and other visible parts of the courseware is that of selecting an appropriate metaphor (Park & Hannafin, 1993). The metaphor provides a familiar framework for the learner. For example, lessons could be represented as individual volumes in a shelf of books. The primary metaphor used in Graphs & Networks is that of the computer lab. Within each main topic, the learner selects an activity by selecting a computer workstation. Figure 6 shows the computer lab for the Graphs & Digraphs topic.

## The Learning Activities

Four learning activities are provided for each topic:

- A tutorial.
- An animated demonstration.



Welcome to the computer lab. Click on a computer to select an activity.

*Figure 6. Computer lab*

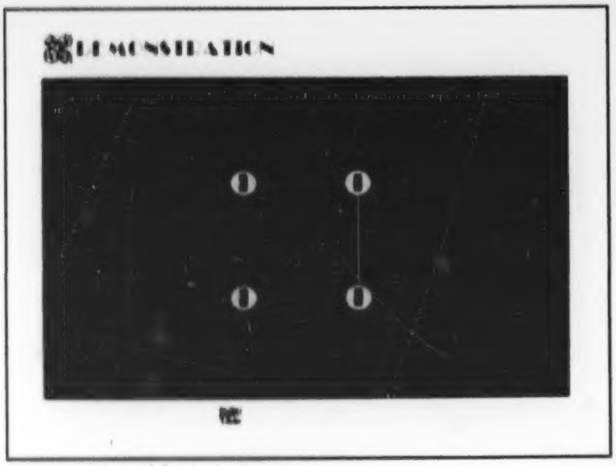
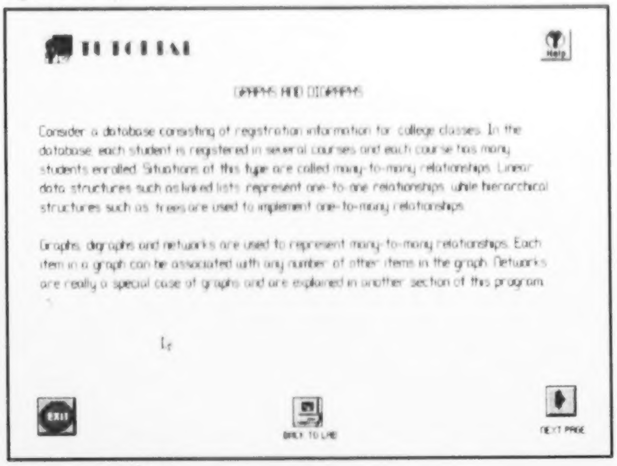


*Figure 8. Animated demonstration page*



GRAPHS AND DIGRAPHS

Consider a database consisting of registration information for college classes. In the database, each student is registered in several courses and each course has many students enrolled. Situations of this type are called many-to-many relationships. Linear data structures such as linked lists represent one-to-one relationships, while hierarchical structures such as trees are used to implement one-to-many relationships.

Graphs, digraphs and networks are used to represent many-to-many relationships. Each item in a graph can be associated with any number of other items in the graph. Networks are really a special case of graphs and are explained in another section of this program.

*Figure 7. Tutorial page*

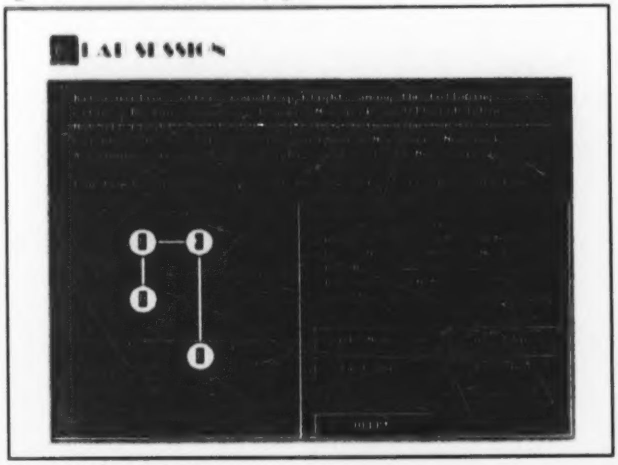


*Figure 9. Lab session page*

- An interactive lab session.
- A self-test.

The tutorials provide the most basic instruction. Concepts, terminology, and examples are provided using text and graphic images in a manner similar to a standard textbook. Hyperlinks are incorporated to provide supplementary material or topics of special interest. Students may proceed at their own pace through the tutorial material. It is recommended that students view the tutorial for a unit before going on to one of the other activities; however, this is not strictly necessary. Figure 7 shows a page from a tutorial activity.

Animated demonstrations are a main feature of the courseware. Many of the concepts, data structures, and algorithmic operations are difficult to visualize. Textbooks have traditionally used sequences of pictures with explanatory notes to illustrate these topics (Naps & Nance, 1995). The use of animation allows students to see the changes in a data structure or the operation of an algorithm as the change progresses. Animations can be replayed as needed to study a specific topic. A page from the animated demonstration on Graphs & Digraphs is shown in Figure 8.

Most learning theories, whether behavioral or cognitive, emphasize the need for learners to perform practical exercises to reinforce and clarify concepts and build skills. The interactive lab sessions in the courseware are intended to provide this type of learning activity. Students perform laboratory activities to solve specified problems or demonstrate phenomena. The activities are interactive. For example, one lab session in the first unit, Graphs & Digraphs, asks the student to build a graph of routes for an airline (see Figure 9). Using a point-and-click interface the student adds nodes and edges to create a graph on screen.

The self-tests are included primarily for students to check their own progress. The test are interactive and

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may involve true/false, multiple choice, or other types of questions. The student receives immediate feedback. Incorrect answers are followed by an explanation of why the answer is incorrect and a suggestion for which learning activities to repeat.

## Development Issues

The following four major concerns dominated the development:

1. Content selection and development.
2. Selection of the authoring tool.
3. Selection of a programming language
4. Collection of materials, in particular professional-looking graphic images.

The general content area was decided upon and narrowed down in discussions with faculty at Nova Southeastern University. It was felt that certain abstract concepts and operations in computer science were difficult to visualize and that the use of interactive, dynamic courseware would be beneficial to students. The area of graphs and networks was chosen because it is relatively more complex than similar topics, thus the treatment would be more useful.

It was decided early in the design process that the courseware would be implemented using a combination of an authoring tool and a conventional programming language. The authoring tool greatly simplified development of the screen layouts including placement of buttons and display of various media such as text and graphic images. NeoBook Professional by NeoSoft Corporation was selected primarily because it employs a point-and-click interface, allowing the author to create multimedia publications without programming.

Certain features of the courseware, such as the interactive lab session and the animated demonstration, were thought to be more easily implemented using a conventional programming language. These custom programs were integrated into the courseware by linking them to a button in the NeoBook publication. QuickBASIC, a compiler version of Microsoft's QBASIC, was selected as the programming language because of its capability to run within a "window" on a NeoBook screen and its standard 16-color, 640x400 screen mode.

In addition to its ease of use and its ability to link to external programs, NeoBook Professional has the capability to compile stand-alone executable programs. Thus, the courseware can be distributed without the need for a viewer or run-time system to execute the application.

As the project got underway, it was evident that the finished product would have a more pleasing appearance if professional-looking graphic images could be used. A search of the World Wide Web yielded several sites rich in free graphics including buttons, backgrounds, icons, balls, and bars.

## Conclusion

Authoring tools and conventional programming languages can be used in conjunction to create courseware that meets learner needs in ways that are effective and interesting. To provide features that meet educational objectives in meaningful ways, it may be necessary to utilize the strengths of a variety of tools combining the results into a unified product. The development of Graphs & Networks is an example of combining two such tools, an authoring system and a conventional programming language.

## References

Aukstakalnis, S., & Mott, W. M. (1996). Transforming teaching and learning through visualization. *Syllabus, 9*(6), 14–16.

Gagne, R. M., Briggs, L. J., & Wager, W. W. (1992). *Principles of instructional design* (4th ed.). Fort Worth, TX: Harcourt Brace Jovanovich College Publishers.

Kaplan, H. (1992). Multimedia in the lecture halls: Science & math visualizations. *T.H.E. Journal, 20*(5), 53–55.

Naps, T. L., & Nance, D. W. (1995). *Introduction to computer science: Programming, problem-solving, and data structures* (3rd alt. ed.). St. Paul, MN: West Publishing Company.

Park, I., & Hannafin, M. (1993). Empirically-based guidelines for the design of interactive multimedia. *Educational Technology—Research and Development, 41*(3), 63–85.

***Thomas Beutel** is an associate professor of computer science at Mount Vernon Nazarene College, Department of Mathematics and Computer Science, Mount Vernon, OH 43050; 614/397-6862; tbeutel@mvnc.edu.*

# Working in a Hypertext Environment: A Project in StorySpace

*by Stephen Sesko, Theresa Nighswonger, and Stanley Lindberg*

In 1994, we decided to begin a project creating a hypertext "web" on the topic of fusion energy that could be accessed by middle school and high school teachers and students. The purpose of this project was twofold. First, we wanted to investigate using a hypertext environment to convey content in an educational setting. Second, we wanted to use this environment to create a massive hypertext document describing the fusion energy programs at the Lawrence Livermore National Laboratory (LLNL). The latter work has been presented at conferences such as CUE, the American Physical Society, NCCE, and NECC. This article concentrates on the first purpose: investigating hypertext environments.

We brought three different perspectives to the project. Stephen Sesko has worked at the Lawrence Livermore National Laboratory for 16 years teaching the laboratory's science to students, teachers, and the general public. He also teaches computer programming at LLNL to gifted children and works with teachers in various computer-based environments, from Logo to telecommunications. Theresa Nighswonger is a social studies and computer education instructor. She has been innovative in creating constructionist methodologies for teaching middle-level students and has created a multimedia course that incorporates projects addressing the multiple intelligences of students. Stanley Lindberg has taught high-school-level social sciences and mathematics. He uses a variety of computer programs and applications on a daily basis.

The theoretical framework originally came from courses taught by Drs. David Moursund and Sharon Yoder at the University of Oregon in 1992. This framework contained, among others, the works of Ted Nelson and Dr. Andries van Dam of Brown University. The framework was further augmented in the spring of 1994, by Brown University's Dr. George Landow, who suggested using StorySpace™ (Bolter, Joyce, Smith, & Bernstein, 1990–1993) software for this project.

The objectives were straightforward. The main objective was to learn the StorySpace software. The second was to gather the fusion energy content from various LLNL documents and create a StorySpace document in which the information in individual "lexia" was linked in a web to similar or related lexia. A lexia is the term used by StorySpace to describe a "chunk" of text, picture, graphic, chart, or other grouping of information. Typically a lexia shows in the web as a small rectangle that is opened into a window. Third was learning how to "chunk" the original text, graphics, pictures, and so on so that they could be imported into StorySpace without retyping. Finally, we prepared it for electronic publication and dissemination.

This was not a research project; therefore, there are no data to share. Rather this was a project in which the authors immersed themselves in a unique computer-based environment with the objective of learning it for future use, in hopes that innovative use of these computer environments would be of value in education.

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This work was performed under the auspices of the United States Department of Energy by Lawrence Livermore National Laboratory under Contract W-7405-Eng-48.

## Definition of Hypertext

"Hypertext," accfording to Nelson (1967), is a combination of natural language and the interactive and nonlinear text that is made possible by computers.

Jeff Conklin (1987) defines hypertext as "a computer-based medium for thinking and communication that allows and even encourages the writer to make many references, and allows readers to make their own decisions about which links to follow and in what order" (p. 32).

The modern day direction of hypertext came from an article published 50 years ago in *The Atlantic Monthly*. In the article "As We May Think," Vannavar Bush (1945), science advisor to President Roosevelt, challenged the scientific community to "turn to the massive task of making more accessible our bewildering store of knowledge" (p. 108). (The full text of this article can be found at http://www.isg.sfu.ca/~duchier/misc/bush/vbush.txt/.)

He declared, "We are bogged down today as specialization extends." And, "the effect to bridge between disciplines is correspondingly supercritical." Bush (1945) stated, "publication has been extended far beyond our present ability to make real use of the record." Therefore, "a record, if it is to be useful must be continuously extended, it must be stored, and above all it must be consulted" (p. 102).

To facilitate recording, extending, storing, and consulting, Bush (1945) predicted that text would be compressed utilizing photography, voice recordings, and symbolic codes for indexing and retrieval. He predicted the extension of symbolic logic from computations to "the logic of everyday affairs" (p. 105), because he thought the human mind works by a process of association (p. 106).

In order to demonstrate how information would be retrieved in such an environment of compressed data, Bush (1945) invented a "mental machine" (one was never built) called Memex. It was a mechanical system of devices, cards, levels, sorters and other apparatus.

Bush's (1945) philosophical ideas were put into theory about 40 years ago by Doug Englebart. As Andries van Dam (1987) of Brown University says, "Doug invented just about everything the rest of us have been doing since" (p. 2). Englebart created the concepts of idea processing, outline processing, links, and text searches.

Englebart's work formed the foundations for Ted Nelson (1967), who, 30 years ago, created the concepts of branching, linking, making arbitrary associations, and stretching text, as well as other features of what he called hypertext. In what Nelson called hypergrams, pictures annotated with text, he invented the foundations of hypermedia.

More practical work in hypertext has been done for the past 20 years by Andries van Dam (1987) at Brown University. His foundations helped lead to the first hypertext conference in 1987, where van Dam predicted that hypertext would become "a mass-media cult phenomenon rather like MacPaint™ and MacDraw™" (p. 6).

The late 1980s saw the emergence of HyperCard™, an authoring system that was a forerunner to a complete multimedia application. HyperCard made it possible for users and creators of software programs to visualize the possibilities of the multimedia environments. Later developments included LinkWay™, LogoWriter™, Director™, and other multimedia and hypermedia applications. The latest incarnations of hypertext are the Web browsers that we are using more and more each day.

## Characteristics Of Hypertext Environments

The characteristics and foundations of hypertext environments, as well as numerous examples to illustrate them, can be found in an informative article by Conklin (1987). According to him, there are four basic types of hypertext systems: (a) macroliterary systems, (b) problem-exploration tools, (c) browsing systems, and (d) general hypertext documents. In this section we will use StorySpace as the main example.

Macroliterary systems are large online libraries with computer-supported interdocument links. Nelson's Xanadu (http://www.peg.apc.org/xanadu) figures prominently in this area. Other examples are Microcosm, from the U. K. (http://www.multicosm.com or http://bedrock.ecs.soton.ac.uk), and the MendelWeb, developed in the United States (http://hermes.astro.washington.edu/mirrors/MendelWeb/home/html/). Naturally, the World Wide Web itself is an example of a macroliterary system.

Some hypertext systems can be used as problem-exploration tools to support unstructured thinking. We place StorySpace in this group. StorySpace is an authoring system in which the user creates and navigates a large body of content in a nonlinear manner.

The content itself may be the problem under investigation, or the content may contain the answers to problems posed elsewhere. Because the content is contained in a web of ideas, the user can freely follow the thread of an idea through the web or pull together several disparate ideas through user-defined links or additional lexia that contain annotations or marginalia.

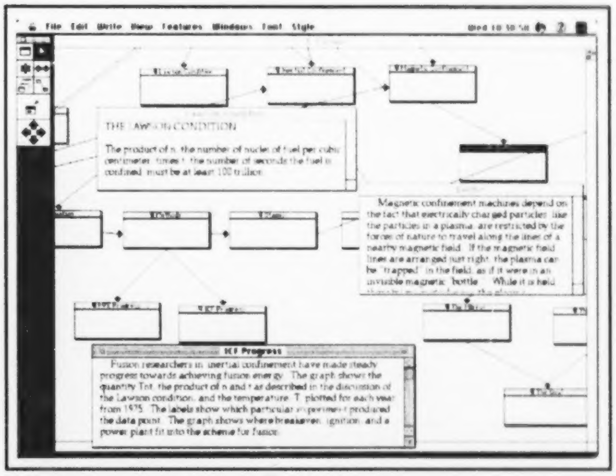
Browsing systems are similar to, but smaller than, macroliterary systems. Conklin (1987) defines these browsers as applications that involve large amounts of existing information or that involve easy access to information and that are easy to learn and use (p. 26). We wonder whether he would include today's numerous Web browsers in this area.

Finally, there is general hypertext technology for reading, writing, and collaboration. StorySpace, as an example, makes it possible to think in "chunks" of information and to link these chunks to others. This nonlinear approach facilitates following a specific idea without interference from other ideas or concepts. If the writer wants to link in other ideas or concepts, he or she can do so, but the reader is not obligated to follow. Thus, the writer can be as free as he or she wishes to be in creating or extending a web. The reader is equally as free in his or her approach to reading the web.

StorySpace facilitates collaboration because of its extensionality, without affecting the original text. Once an initial writer has entered a web of lexia, collaborators can add to the web, either through additional links or through additional lexia and links. Additional lexia might contain new content or annotations to existing content. Individual webs can also be linked to other webs, which makes a different level of collaboration possible.

Each of these four systems contains the following seven attributes.

1. It must be computer-supported idea processing. Our fusion web had 90 lexia with over 100 links. Imagine 90 pieces of paper strung together in various combinations with 100 pieces of string. This is how it might have been done before computer support.
2. It must have a database of textual and graphical nodes. In StorySpace each lexia is one node of the entire database, which is the web itself. These lexia can contain either text or graphics (StorySpace even supports QuickTime™ movies), and the visible lexia are graphical and textual in and of themselves.
3. It must have windows on the screen corresponding to each of the database nodes (see Figure 1). Each has a name or title, and multiple open windows are possible.
4. It must support standard window operations such as repositioning, resizing, closing, putting aside, and cues to remembering the contents of the window. As shown in Figure 2, multiple windows can be open simultaneously in any size or shape, and located anywhere on the screen.
5. Windows contain link icons that connect to other nodes, allowing nonlinear organization of text. Figure 3 shows a StorySpace web section. Each box is an unopened lexia. The lines are the visual links between and among the lexia. Figure 4 shows links within a window.
6. New nodes can be created with new links. In hypertext, there must be dynamic linking between and among newly developed data and existing infor-



THE LAWSON CONDITION

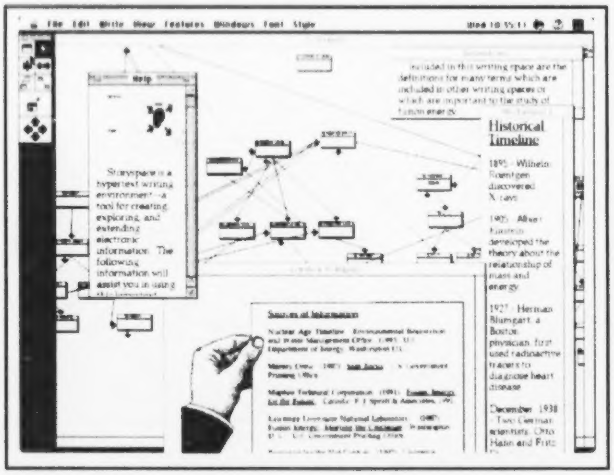
The product of n, the number of nuclei of fuel per cubic centimeter, times t, the number of seconds the fuel is confined, must be at least 100 trillion.

Magnetic confinement machines depend on the fact that electrically charged particles, like the particles in a plasma, are restricted by the forces of nature to travel along the lines of a nearby magnetic field. If the magnetic field lines are arranged just right, the plasma can be "trapped" in the field, as if it were in an invisible magnetic "bottle." While it is held

ICF Progress

Fusion researchers in inertial confinement have made steady progress towards achieving fusion energy. The graph shows the quantity Tnt, the product of n and t as described in the discussion of the Lawson condition, and the temperature, T, plotted for each year from 1975. The labels show which particular experiment produced the data point. The graph shows where breakeven, ignition, and a power plant fit into the scheme for fusion.

*Figure 1. A portion of the StorySpace web that shows data corresponding to three different lexia*



Storyspace is a hypertext writing environment—a tool for creating, exploring, and extending electronic information. The following information will assist you in using

Included in this writing space are the definitions for many terms which are included in other writing spaces or which are important to the study of fusion energy.

Historical Timeline

1895 - Wilhelm Roentgen discovered X-rays

1905 - Albert Einstein developed the theory about the relationship of mass and energy

1927 - Herman Blumgart, a Boston physician, first used radioactive tracers to diagnose heart disease

December 1938 - Two German scientists, Otto Hahn and Fritz

Sources of Information

*Figure 2. StorySpace supports multiple windows, sizing, and positioning*

mation. This mechanism can be annotation, comment, elaboration, etc. From the StorySpace toolbar it is easy to select an icon and create a new lexia. Using the mouse, a link line can be drawn from one lexia to another. Words in one lexia can be linked to another lexia in the same manner. StorySpace allows the user to add links or nodes and color-code text or nodes. The user can also send this personalized edition to other users, who can also edit or personalize the web and send it on.

7. A hypertext system is can be browsed in three different ways:
   - Following links and opening windows (see Figure 5).
   - Searching the database for a string, wild card, keyword, or value (see Figure 6).
   - Navigating graphically or textually through web view, chart view, or outline view (see Figure 7).

## Disadvantages

The most important disadvantage to any hypertext document is the user's tendency to become lost in hyperspace. As noted by van Dam (1987), "the richer the hypertext, the greater the navigational problem" (p. 11). To counteract this problem, there must be a visible structure, outline structure, cross-reference structure, and "timeline" so that the user can see what has gone before. There must be a way to "neighbor," or to see the current node in context with other nodes that could precede or follow the current one. Finally, there must be strong visual indexes. Although van Dam pointed this out as a disadvantage, we found this disadvantage minimized in StorySpace. In StorySpace, users can keep a mental image of the total hypertext environment as well as their current location within that environment. Cross-referencing and links can be relatively simple to use and locate within the web. The color coding offered in StorySpace adds to the

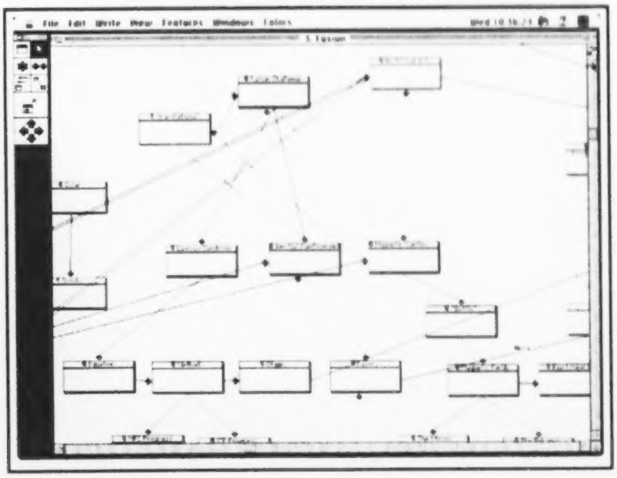


*Figure 3. Boxes represent lexia and lines indicate links*

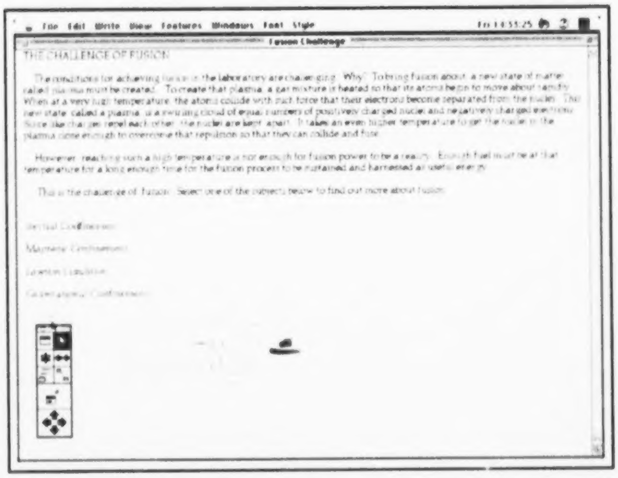


*Figure 4. Links within an individual lexia appear within the text or following it and are indicated by different colors on screen*

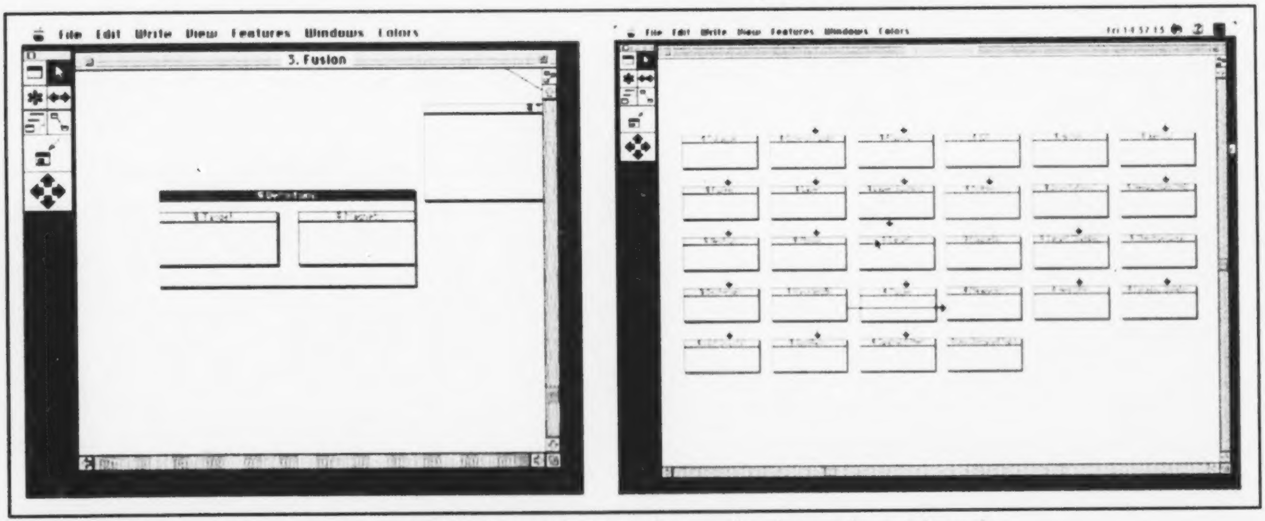
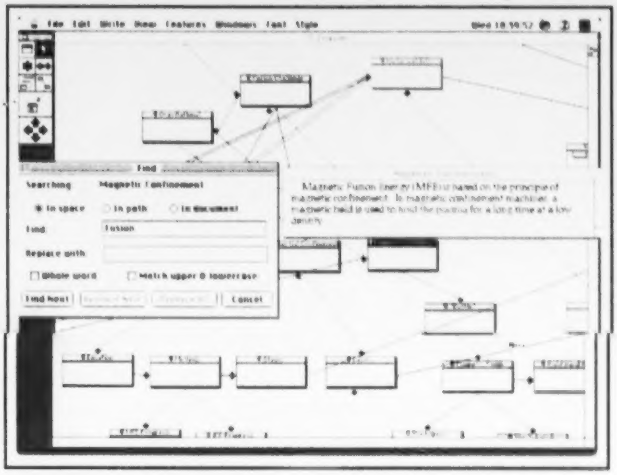


*Figure 5. Each lexia can contain aditional lexia. The highlighted lexia is closed in the first example and open in the second example*


File Edit Write View Features Windows Font Style
Find
Searching Magnetic Confinement
● In space
○ In path
○ In document
Find Fusion
Replace with
☐ Whole word
☐ Match upper & lowercase
Find Next
Cancel

Magnetic Fusion Energy (MFE) is based on the principle of magnetic confinement. In magnetic confinement machines, a magnetic field is used to hold the plasma for a long time at a low density.

*Figure 6. Links and windows appear in the background. StorySpace's search engine (the "find" dialog box) is open*

visual image and organization of the web, whereas the road map provides an immediate visual orientation.

Two disadvantages must be considered when hypertext is used by youthful users whose cognitive structures are still in the formative stages. First is the issue of mental management. While reading within a lexia, users must keep a mental image of where they are within the total program. Cognitive management of this image could serve to distract youthful users from the content and purpose of the total environment. StorySpace has its links behind the user interface, so users can elect whether to see the links by selecting the "show links" feature. By showing the links, users can maintain orientation to the total program. With the links hidden, users can navigate through the program without worrying about their location. For the youthful users experimenting with our webs, some wanted to know where they were in the environment and others did not.

The second disadvantage for youthful users is the concentration needed to maintain several tasks or threads at once. The reader needs to be able to read across the surface of the text and move into it through bookmarks, marginal notes, and user-defined links. StorySpace also allows the user to personalize information. Although this may be more mental management than most young users are comfortable doing, the students who used our program easily became familiar with the glossary, timeline, and cross-references. As young users become acquainted with programs that have the capabilities of linking and cross-referencing, their facility with them increases.

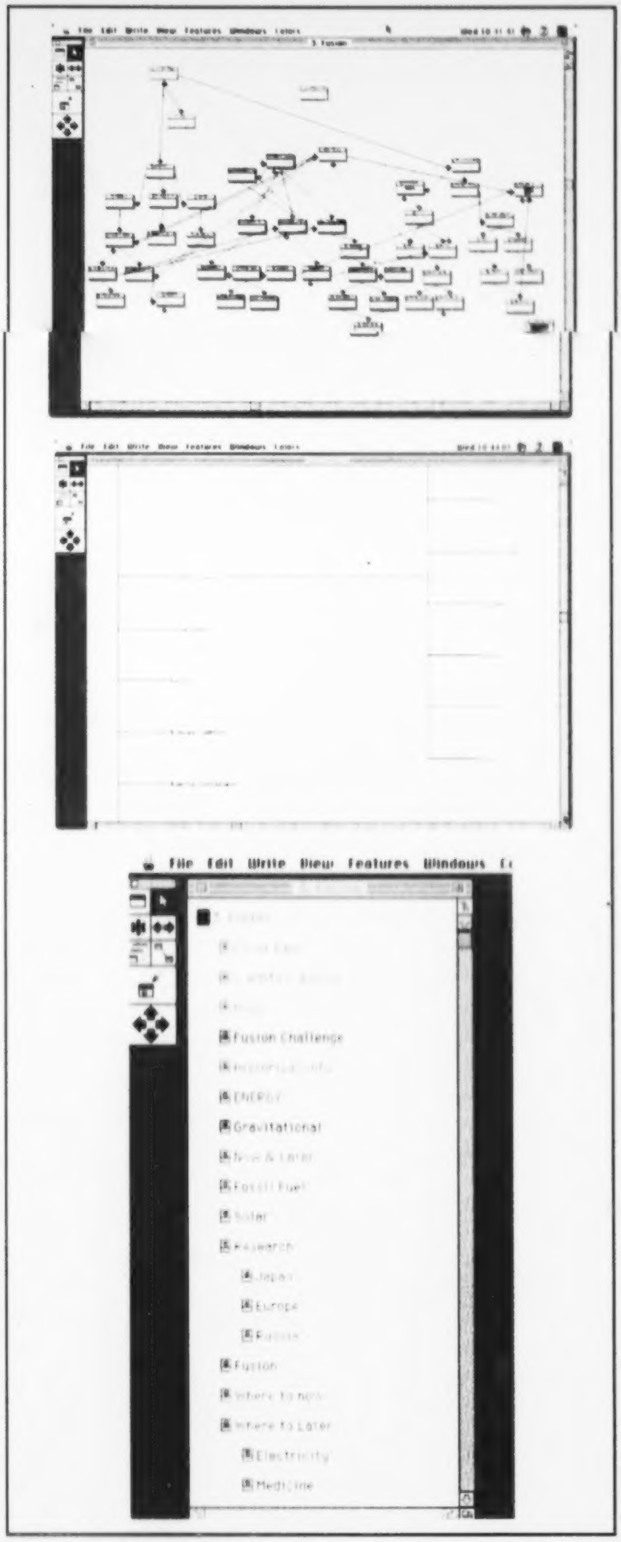

File Edit Write View Features Windows Colors
Fusion
File Edit Write View Features Windows
Fusion Challenge
ENERGY
Gravitational
Now & Later
Fossil Fuel
Solar
Research
Japan
Europe
Russia
Fusion
Where to now
Where to Later
Electricity
Medicine

*Figure 7. StorySpace can be navigated in three different ways: (a) in web view by following links from one lexia to another, as in the first example; (b) in chart view, as in the second example; and (c) in outline view, as in the third example*

## Design

The web design is important to its readability, function, and ease of use. Both the author and the reader should have control over the web to meet different needs: The author needs to control the physical layout of the lexia and the links that connect them, and the reader should be able to easily make changes to the layout, add lexia, and create new lexia. StorySpace answers both of these design issues. Author and user can create and position any number of lexia and make as many links as needed, using a simple point-and-click process (see Figure 8).

Lexia that contain related topics can be grouped by color, helping to minimize user disorientation. StorySpace also includes two types of road maps that the reader can use to avoid being lost in hyperspace (see Figure 9).

Lexia in a web can contain text, scanned images, or both. Passages of text—words, phrases, or sentences—or images can serve as the beginning or the end of a link. Although we did not investigate this feature, QuickTime movies can also be included in the StorySpace node.

The StorySpace toolbar is small but comprehensive allowing a new user to create, navigate, modify, or extend a web quickly and easily.

## Conclusion

We know children construct their knowledge in a process of dialectic: An original idea is challenged by the presentation of new and possibly contradictory information. The learner creates a synthesis of the old idea and the new information to construct a new learned thing. James Brian Quinn of Dartmouth said, however, that "information is interesting only insofar as it affects other things" (as cited in Wright, 1990, p. 85).

In a hypertext environment, learners can explore and personalize information in ways that help them to construct personal meanings that might not be apparent in standard linear text. But "technology requires learning. With computer technology the pay off is unknown," said Lucy Suchman of Xerox PARC (as cited in Wright, 1990, p. 88).

But the content of text is also important. Christopher Dede has said that our first level of knowing is Data. Data are inert. It is only when data are accessed that we begin to develop Information. When Information is used and acted upon, we begin to develop Knowledge. In the best of all worlds, Knowledge can be built into Wisdom. Our task as educators is to help learners to move through this continuum. With tools such as StorySpace, teachers may find it easier to help children reach a higher level than just Information.

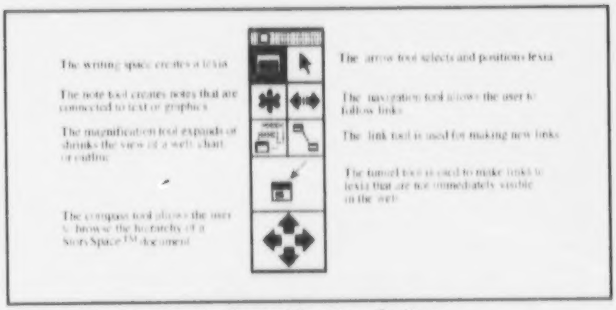
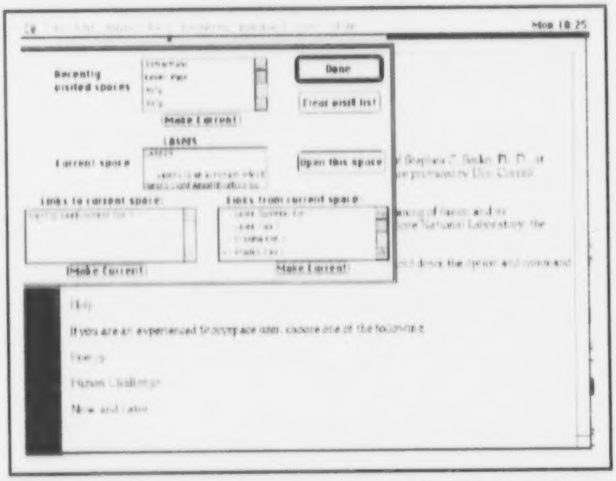

The writing space creates a lexia
The note tool creates notes that are connected to text or graphics
The magnification tool expands or shrinks the view of a web chart or outline
The compass tool allows the user to browse the hierarchy of a StorySpace™ document
The arrow tool selects and positions lexia
The navigation tool allows the user to follow links
The link tool is used for making new links
The tunnel tool is used to make links to lexia that are not immediately visible in the web

*Figure 8. The StorySpace toolbar and its various finctions*


Mon 10:25
Recently visited spaces
Done
Clear visit list
Make Current
Current space
Open this space
Links to current space:
Links from current space:
Make Current
Make Current

If you are an experienced StorySpace user, choose one of the following

*Figure 9. One of the StorySpace "road maps." This dialog box gives you the following information: (a) where you have been, shown in the top box; (b) where you are, shown in the center box; (c) links to the current space, shown in the box in the lower left corner; and (d) links from the current space, shown in the box in the lower right corner*

## References

Bolter, J. B., Joyce, M., Smith, J. B., & Bernstein, M. (1990–1993). StorySpace. Cambridge: Eastgate Systems, Inc.

Bush, V. (1945, July). As we may think. *The Atlantic Monthly*, 1945.

Conklin, J. (1987, September). Hypertext: An introduction and survey. *Computer*, 1987.

Nelson, T. (1967). Getting it out of our system. In G. Schechter, (Ed.) *Information retrieval: A critical review*. Washington, DC: Thompson Books.

van Dam, A. (1987, November). *Is text data?* Keynote address at Hypertext '87 conference, Chapel Hill, NC.

Wright, K. (1990). The road to the global village. *Scientific American, 262*(3), 83.

# Simulation in Web-Based Virtual Environments

*by Marlyn Kemper Littman*

Imagine using your desktop computer at school or home to create a virtual city with three dimensional (3-D) objects and images from around the globe or learn about early civilizations by surfing through interactive multimedia simulations of Paleolithic figurines, Stonehenge and ancient paintings from Lascaux Cave. These scenarios are becoming possible with the implementation of virtual reality (VR) applications on the World Wide Web. Web-based VR simulations have the potential to support instructional innovations in the access, use, and retrieval of networked multimedia educational resources in the learning environment.

VR is described as a technological revolution equivalent to the invention of movable type and the printing press (Littman, 1996a). Remarkable improvements in the capabilities of computer systems; user-machine interfaces; and high-performance, high-speed broadband networks supporting reliable voice, video, data, and image transmission in real time are contributing to the enthusiasm about current and emerging Web-based VR applications. The design, development, and implementation of Web-based virtual worlds could enable high school students to do the following:

- Perform virtual science experiments with hazardous materials.
- Learn tactics for self-defense, firefighting, and crime prevention.
- Experience mountain climbing, swimming, and hockey.
- Gain skills for operating cars, tractors, submarines, and airplanes.
- Virtually participate in landmark events such as planetary exploration.

Realizing the potential of VR systems is extremely challenging. VR creation is intricate and detailed. VR application development involves the participation of individuals from such disciplines as telecommunications, robotics, computer science, cognitive psychology, and mechanical and electrical engineering (Littman, 1996b).

Despite the media hype associated with this interdisciplinary field, there is no currently accepted definition of VR. Computing and communications standards for VR applications are in a state of flux. Ethical implications of powerful VR initiatives, such as those related to AIDS, abortion, alcoholism, violence, and drug addiction, must be addressed. Educators are only beginning to examine the full impact of using the Web for generating new types of virtual learning experiences in school and university settings.

In this paper, recent developments for simulation and interaction in Web-based virtual worlds are presented. Guidelines for accessing VR browsers on the Internet to explore virtual Web sites are delineated. Prototypes of immersive displays and current- and next-generation virtual worlds are described. A glimpse of future possibilities with deployment of Web-based VR systems is provided.

## VR Fundamentals

VR involves development of a simulation in which computer graphics are used to create a realistic-looking virtual world. This synthesized world is a dynamic one, responding to user inputs such as voice commands and actions of the head, hands, and feet. The user has the impression of moving about in a static world even though the static world is a simulated one that is created artificially.

VR is a powerful human-computer interface. It offers the potential to visit unexplored territories, mythical domains, science fiction realms, and cartoon lands. Any topic or situation imaginable can be examined. Consider the impact of using Web-based VR for constructing learning experiences such as the following:

- Being in a scene with Tom Sawyer in a Mark Twain novel about Huckleberry Finn.
- Doing research in real time at the Library of Congress with President Abraham Lincoln.
- Participating in a civil rights march with Martin Luther King in Selma, Alabama.

- Singing arias with Luciano Pavarotti at the Acropolis in Athens.
- Painting Guernica with Picasso.
- Sculpting David with Michelangelo.
- Deep sea diving with Jacques Cousteau.

A virtual environment incorporates auditory, tactile, visual, gustatory, and olfactory cues; acoustic, atmospheric, and color impressions; and real-time graphics into a model of reality that communicates with the human senses (Littman, 1996c). Multiple levels of interactivity are supported that contribute to the feeling of immersion in this simulated world. For instance, fly-through VR allows the participant to turn, look, and move in any direction in the virtual environment. Reactive VR combines the freedom of fly through VR with the ability to push, pull, and change the shape of 3-D human and nonhuman objects distinguished by such features as size, shape, and texture populating the virtual environment.

Entrance into the virtual environment is facilitated with the use of appropriate tools and software that enable varying degrees of immersion (Von Schweber & Von Schweber, 1995). Through-the-window immersion is achieved with the use of a data projector or standard computer monitor that provides a window into a virtual environment that seems to lie on the other side of the screen. Into-the-room immersion is accomplished with the use of a stereo-ready projector or monitor featuring stereoscopic images that can be experienced with the use of polarized glasses. Fully immersive VR is supported with the use of virtual gear that transports the user into the virtual setting. For example, participants equipped with head-mounted display (HMD) units, DataSuits, and DataGloves no longer simply click a mouse button to move a 3-D object, such as a virtual doorknob; instead they reach out directly to virtually move an object in the same way that a real one is moved in the real world. Total immersion can involve sound; sight; and touch and its associated sensations of weight, motion, and temperature (Littman, 1996a).

Web-based virtual applications are found predominantly in the through-the-window VR category. The extent to which advanced VR technology becomes widely available on the Web depends on factors such as funding; basic research; and cooperation and communication among the military, government agencies, industry, academic institutions, and standards and regulatory bodies. Although Internet addresses are subject to change, the Web features a wealth of material in the VR arena. Information on recent advances in design techniques for virtual environments and in the development and use of VR software, hardware, and peripheral devices are reflected on the Web at such sites as the VRML repository (http://www.sdsc.edu/vrml/).

## VRML and the Web

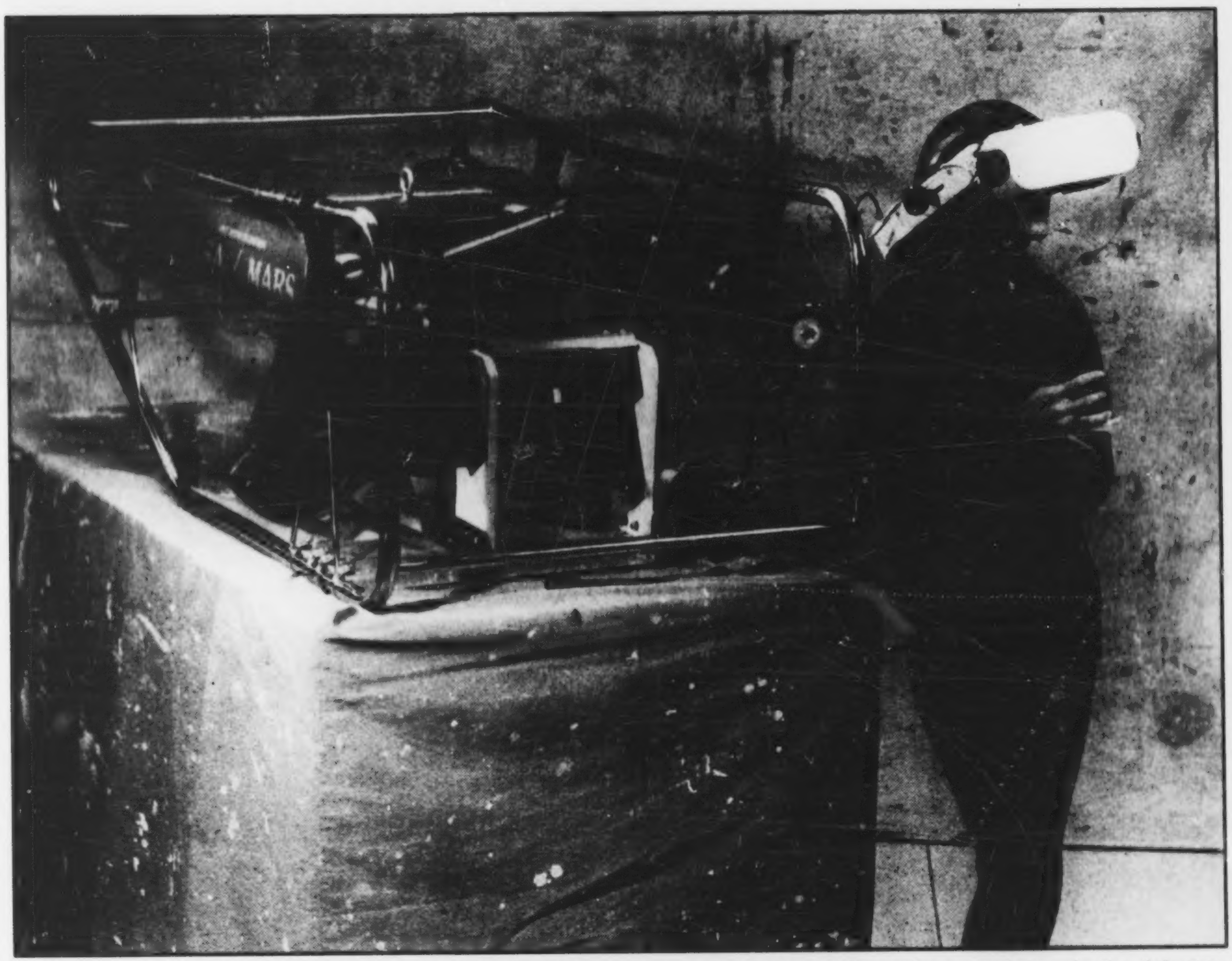
The ability to navigate the Web in 3-D originated with the development of VRML (VR Modeling Language), a platform independent language for VR and shared virtual worlds. VRML (pronounced "vermel") is a developing standard that describes how 3-D objects and worlds are experienced on the Web. Information on VRML FAQs (Frequently Asked Questions), tools, browsers, sites, and design is found at http://webreference.com/vrml/faqs.html.

In addition to supporting virtual interaction with multiple participants online, VRML also makes possible the ability to hyperlink objects to other virtual worlds and HTML (HyperText Markup Language) documents. Although VRML 1.0 supports navigation and the ability to click objects for accessing information, VRML 1.0 environments are generally static and limited in enabling interactive behavior. An extension of VRML 1.0, VRML 2.0, also known as Moving Worlds, supports such features as animation, sound, and collision detection (http://webspace.sgi.com/moving-worlds/index.html). Specifications for Moving Worlds were originally developed by Silicon Graphics in response to a Request for Proposals from the VRML Architecture Group.

The VRML Architecture Group is creating a scalable, totally interactive standard for VR development on the Web by fostering a consensus among users, product vendors, and equipment manufacturers (http://vag.vrml.org/). Those wishing to join the VRML standards discussion can subscribe to the www-vrml list by sending e-mail to: majordomo@wired.com with "subscribe www-vrml < your-e-mail-address > " as the body of the message.

## VRML Browsers

A VRML browser allows the user to view a VRML document. VRML browsers on the Web often exist in a beta version or other form of early release. With VRML brows-



*As this picture from the NASA Ames Research Center in Mountain View, California, demonstrates, VR initiatives allow students to experience exploration of planetary surfaces by interacting with 3-D, computer-generated worlds. A virtual system includes integrated components such as a database of the virtual environment (VE) to be manipulated or studied. A virtual system such as the one pictured here also involves use of a special HMD (Head Mounted Display) to supply 3-D sights and sounds. The hand-held unit features special electronic sensors that let participants interact with the virtual world through hand gestures. NASA has been exploring the use of VR technology and techniques for more than three decades.*

ers, users can build 3-D worlds and create hyperlinks by using URLs from their 3-D environments to 2-D browsers, like Mosaic, or 3-D browsers, like Netscape. When a link is selected to a VRML document from within a Web browser, a VRML viewer is launched, a VRML file string is downloaded, and the user has the experience of walking around in a virtual model. Directions for browser installation and configuration can be acquired at the site from which the browser is downloaded.

VRML browsers include the following:

- Netscape Live3D. Netscape Live3D is used in conjunction with Netscape Navigator. This browser allows the user to experience 3-D worlds containing text, animation, images, sound, video, and music. Live3D includes tools for developing 3-D applications and is based on the VRML 2.0 specification. Platforms supported include Windows '95, Windows NT, Windows 3.1, and Power Macintosh. Applications designed with Live3D include chat environments, multiuser 3-D games, authoring environments, geographical information systems, online presentations, database visualizations, and interactive advertisements (http://www.netscape.com/).
- Microsoft VRML. A plug in VRML 1.0 browser for Microsoft Internet Explorer 2.0, Microsoft VRML supports Windows '95 and enables the user to navigate through virtual environments with a joystick, mouse, or keyboard (http://www.microsoft.com/).
- Virtus Voyager. Virtus Voyager supports platforms

that include Macintosh, Power Macintosh, and Windows '95. This browser can be used with Netscape or Mosaic as well as Virtus' proprietary file format. 3-D modeling programs such as Virtus Voyager support creation of virtual worlds on the Internet or on a PC without starting from scratch (http://www.virtus.com/voyager.html).

- Vream's WIRL. A plug-in from Vream, WIRL supports Windows '95 and Windows NT and features authoring and multiparticipant capabilities. WIRL is compatible with Netscape Navigator 2.0 and Microsoft Internet Explorer and also works as a standalone VR browser or helper (http://www.vream.com/).
- Sony's Cyber Passage. Sony's Cyber Passage supports VRML 2.0, thus allowing the user to move around in a virtual world in which images and sounds create a sense of presence. Users worldwide are able to share a 3-D scene and chat with each other. Information on Cyber Passage is available at http://vs.sony.co.jp/.
- Silicon Graphics' Cosmo Player for Windows '95. Information on this VR browser can be found at http://vrml.sgi.com/.
- Superscape's Viscape. Superscape's Viscape supports VRML 2.0 and operates as a standalone 3-D viewer as well. With Viscape, users can explore SuperCity, a 3-D version of the Superscape's Web site that also portrays interactive virtual worlds from companies that include Infoseek, Northern Telecom, Intel, and Tandem Computers. Superscape's Viscape is available at http://www.superscape.com/.

VR browsers allow users to look around in scenes; turn objects; play audio; change their views; magnify a part of a scene for an in-depth look; or pull back to see an enlarged area with a mouse, arrow keys, and special functions keys.

### QuickTime VR Player

Created as a helper application, the QuickTime VR Player from Apple enables a Web browser to display QuickTime VR scenes and object movies in a separate window and works on a Mac or PC platform without special hardware. Directions for installing QuickTime VR are available at http://qtvr.quicktime.apple.com/InWin.htm. QuickTime VR panoramas created with Apple's QuickTime VR Toolkit of the Church of San Miniato in Florence Italy can be viewed at http://www.maine.com/shops/gpicher/miniato.html.

### VR Projects and Prototypes

VR deployment on the Web supports a wide range of applications. The following projects and prototypes highlight the current state of Web-based research and activities in the VR field.

### VR and Distributed Networked Environments

Creating a virtual environment that supports real time interaction, communications links, and actions of participants as they move about in and interact with a constantly evolving virtual world is complex. DVE (Distributed Virtual Environment) is a software system that facilitates interactivity among multiple participants in a shared virtual space. According to Stytz (1996), DVE technology involves the concurrent use and integration of multiple computer systems and such DVE components as computer-generated actors, operator systems, remote hosts, and servers. Initially DVEs were used by the military for training simulations.

Projects on the Web related to the DVE concept include DIVE (Distributed Interactive Virtual Environment). An Internet based VR system, DIVE supports participants as they navigate and interact in 3-D space with applications and other users (http:// www.sara.nl/Rik/SGGG/sg3_news_6/section3_9.html). Capable of supporting such input and output devices as a HMD and flying mouse, DIVE software is available via anonymous FTP from sics.se in pub/dive/.

### VR and Education

There are a number of interesting VR educational initiatives in such subject areas as mathematics on the Web. Designed with Virtus Walkthrough Pro 2.0 and saved as a QuickTime move, the calculus odyssey promotes student understanding of abstract principles and concepts including perspective and spatial environments in a virtual world that supports a sense of telepresence (http://www.oise.on.ca/~sinkpen/VRED.html).

Stuart Alexander (personal communication, June 8, 1996), Eastern Regional Sales Manager for Superscape, noted that Superscape is participating in an innovative collaborative instructional project with New Brunswick Community College in Canada and the Ministry of Economic Development and Tourism to equip students with skills and expertise in designing real world VR applications for business and industry. According to Alexander, outcomes from these projects will be featured in VR worlds on the Web.

## VR and the Learning Disabled

Members of VIRART (VR Applications Research Team) at the University of Nottingham are developing initiatives for youngsters with severe learning disabilities to give them a perception of mobility regardless of their cognitive or physical impairments (http://quoll.maneng.nott.ac.uk/Research/). Virtual environments such as the following are being created and distributed to users with special needs:

- A virtual city that provides real-world experience driving around a new city.
- A virtual house that features a living room, bedroom, dining room, and working kitchen where it is possible to make a cup of tea.
- A virtual supermarket that allows users to push a cart around, select grocery items, and pay for them.
- Virtual skiing that enables participants to experience skiing on beginner, intermediate, and advanced ski runs.

In addition to instructional projects, VIRART team members are exploring the creation of cranes, storage and distribution depots, and shop floor layouts in Web-based VR prototypes as aids for engineers involved in factory planning as well.

## VR and Manufacturing

Simulation-based design (SBD) for manufacturing industries enables cost-effective product design and maintenance. Efforts in this arena have been promoted by the Lamar Information Technologies Research Consortium of the Texas University System (http://www.luroc.edu/sbd-gcrmtc/sbd.html). Consortium goals include development of a laboratory facility for using high performance computers and communications networks to support real time simulation and collaboration among geographically distributed design teams.

VR technology promotes zero defect manufacturing and enables engineers to avoid unnecessary prototyping, thereby decreasing the design-to-production schedule. In addition to supporting "what if" scenarios, VR development accommodates requirements ranging from product design to process engineering without the high costs of developing physical prototypes.

Virtual manufacturing and virtual prototyping software products created by Deneb Robotics, Inc. are used for production, workplace design, training for increased productivity, and ergonomic assessment (http://www.deneb.com/). Information detailing the purpose of such simulations as a virtual factory, shop floor, and machine tool for training is available at the Web site sponsored by the Concurrent Engineering Center of the Oak Ridge Centers for Manufacturing Technology (http://www.ccs.ornl.gov/SC95/CMTdemo.html).

## VR and Architecture

VR applications involving architecture on the Web range from existing or proposed buildings in Los Angeles and Salt Lake City to the Jerusalem City Hall, an Italian castle, and an operating room. The Walkthrough Project at the University of North Carolina at Chapel Hill features development of interactive graphics systems that allow participants to interact with architectural models during the design process (http://www.cs.unc.edu/~walk). Graduate students at Georgia Institute of Technology's College of Architecture use Conceptual Design Space (CDS), a 3-D VR tool for planning new buildings (http://www.cc.gatech.edu/gvu/virtual/CDS/). Created at Washington University by the Cascadia Community and Environment Institute and the Urban Planning and Human Interface Technology Laboratory, CEDeS (Community and Environmental Design and Simulation) promotes teaching and research in advanced simulation techniques for landscape, urban design, and artificial virtual environments (http://www.hitl.washington.edu/projects/index.html).

The Virtual Design Studio initiative features a collaborative effort between students and their instructors at universities in Europe, North America, and Asia for exploring design techniques over a WAN (wide-area network) (http://www.architecture.ubc.ca/vdsintro-96.htm). Sponsored by the Stanford Distributed Systems Group, the PARADISE (Performing ARchitecture for Advanced Distributed Interactive Simulation Environments) project involves creation of 3-D simulations running over a WAN as well. Applications supported include DIS (Distributed Interactive Simulation) military exercises, amusement park rides, multiplayer games, and collaborative design (http://

www.dsg.stanford.edu/paradise.html). Projects in the field of VR and architecture developed by University of Utah's Graduate School of Architecture are reported at http://www.arch.utah.edu/vrmlpage.htm.

## VR and Entertainment

The entertainment industry is increasing general awareness and promoting the popularity of VR applications in such movies as *The Lawnmower Man* and *Disclosure*. The Web includes a wide array of interactive puzzles, toys, action adventures, and game-like simulations for virtually participating in tennis, basketball, and soccer. An overview of this facet of VR is available at Zarf's ex-list of interactive games (http://www.leftfoot.com/real-games.html). The Zombie VR Entertainment site features information on VR action games (http://www. zombie.com/). Peripheral devices that can be used in conjunction with VR entertainment on PCs include Virtual i-glasses! by Virtual i-O, a lightweight HMD that displays 2-D and 3-D images and features stereo sound (http://www.vio.com/).

The University of Kansas sponsors projects for studying the use of telepresence in theater production. *Wings*, a production from the university's VR On-Stage project, requires audience participants to wear i-glasses! by Virtual i-O for viewing computer generated objects, virtual worlds, and video images portraying the main character's state of mind as she suffers from a stroke (http://kufacts.cc.ukans.edu/ ~ mreaney/wings.html).

## VR and Medicine

The field of medicine employs VR for teaching and research (Littman, 1996c). Recent advances in visualization techniques permit teams of surgeons, diagnosticians, and practitioners to collaborate in shared virtual worlds ranging from examination rooms to hospitals. The possibilities are intriguing. With VR simulations, interns can learn surgical procedures by performing operations on a virtual patient in a virtual operation under the direction of a surgical specialist, and a neurologist may one day use a body suit to restore an illusion of motor experience to an adolescent paralyzed in a car crash.

According to Liu et al. (1996), one of the fastest growing applications for scientific visualization is medical imaging. At National Cheng-Kung University, researchers have created a distributed interactive system called DISCOVER (Distributed Interactive Scientific Computing and Visualization Environment) that allows radiologists to interactively manipulate and display 2-D and 3-D medical objects that include images of the chest and lung. Through the use of this technology, physicians can diagnose complex bone fractures and develop solutions for treatment. Plans are in progress for using DISCOVER in distributed computing environments.

Another fascinating VR project at the Neumann Biomedical Visualization Laboratory at the University of Illinois at Chicago involves modeling the human eye so that ophthalmology residents can learn how to correct a detached retina. Information on this project is available on the Web at http://www.bvis.uic.edu/bvl/eye/. The role of VR and medical education at Dalhousie University can be examined at http://www.mcms.dal.ca/dme/mivirt.html.

## Assessment Considerations and Instructional Implications

The quality of the VR experience is extremely important. The virtual experience must be believable in order to stimulate productivity and creativity. Information in VR applications should be organized in a clear, logical, and meaningful way so that, when users move from one topic to another or from one source to another, they build connections that reinforce comprehension and learning. Poorly designed VR applications can result in cartoon-like graphics and frustrated users. Questions that can aid in the initial assessment of the viability of Web-based VR applications in the learning environment include the following:

- What kinds of hardware and software packages are needed to support interactivity and immersion in the Web-based virtual environment?
- What is the budgetary allocation for VR implementation? Are there sufficient funds available? Is this type of project feasible?
- Can the school's Internet Service Provider support data transfer at speeds necessary for distributed VR demonstrations?
- Are expanded learning opportunities supported by Web-based VR applications? In what ways, for instance, can student participation in simulations of ancient sites in Greece or Rome, visiting simulations of the heart, or remotely experiencing the eruption of a volcano lead to the acquisition of new knowledge, skills, and capabilities; promote understanding

and independent thinking; and contribute to improved performance in the classroom setting?

- What criteria should be used for selecting among the potentially broad array of VR instructional applications on the Web for classroom demonstrations?

On the basis of this initial assessment, a report can be generated indicating financial constraints, equipment requirements, and key goals and objectives for Web-based VR application use and deployment in the school and university environment.

VR tools for designing Web-based applications vary widely according to features, audio, video, and graphics capabilities; delivery platforms; user interfaces; vendor support; performance; and ease of learning. Their selection should reflect an analysis of organizational specifications and requirements.

Predictions can be made that, with the maturation of VR technologies, traditional paths to knowledge will be reevaluated, and the typical paradigm of teacher-student interaction will be reengineered. Through the incorporation of VR applications into the curriculum, educators will be able to diversify their teaching strategies to help students learn in accordance with their specific strengths. Their instructional roles in the learning process as facilitators and change agents will be enhanced.

A school site will become an arena for virtual communication where all types of learning are possible. No longer bound by time or place, students will interact in virtual educational communities and experience new knowledge domains with peers, instructors, and experts around the globe.

## In Summary

VR allows users to immerse themselves in virtual worlds that can be explored interactively in real time. VR development that supports the feeling of immersion involves the creation of virtual environments populated with human and nonhuman actors and interactive virtual objects.

Designing VR environments is complicated and complex. VR implementation in Web-based environments requires careful planning and execution. VR development can be facilitated by the creation of cost-effective design tools that are accessible for both programmers and non programmers (e.g., educators, trainers, artists, and medical specialists). Web-based applications facilitating multisensory immersion demonstrate the potential of VR in facilitating instructional enhancement and enrichment in the school and university setting.

## References

Littman, M. K. (1996a). Alternative meanings through the world of VR. In K. Vandergrift (Ed.) *Mosaics of meaning* (pp. 425-455). Lanham, MD and London: Scarecrow Press.

Littman, M. K. (1996b). Enhancing instruction through VR. *In Proceedings of the 13th International Conference on Technology and Education, Volume 1* (pp. 31-33). Grand Prairie, TX: ICTE.

Littman, M. K. (1996c). Perspectives on VR in the learning environment. *HyperNexus: Journal of Hypermedia and Multimedia Studies, 6*(3), 4-7.

Liu, P. W., Chen, L. S., Chen, S. C., Chen, H. P., & Hwang, S. S. (1996). Distributed computing: New power for scientific visualization. *IEEE Computer Graphics and Applications, 16*(3), 42-51.

Stytz, M. R. (1996). Distributed virtual environments. *IEEE Computer Graphics and Applications, 16*(3), 19-31.

Von Schweber, L. & Von Schweber, E. (1995). World builders. *PC Magazine, 14*(15), 172-179.

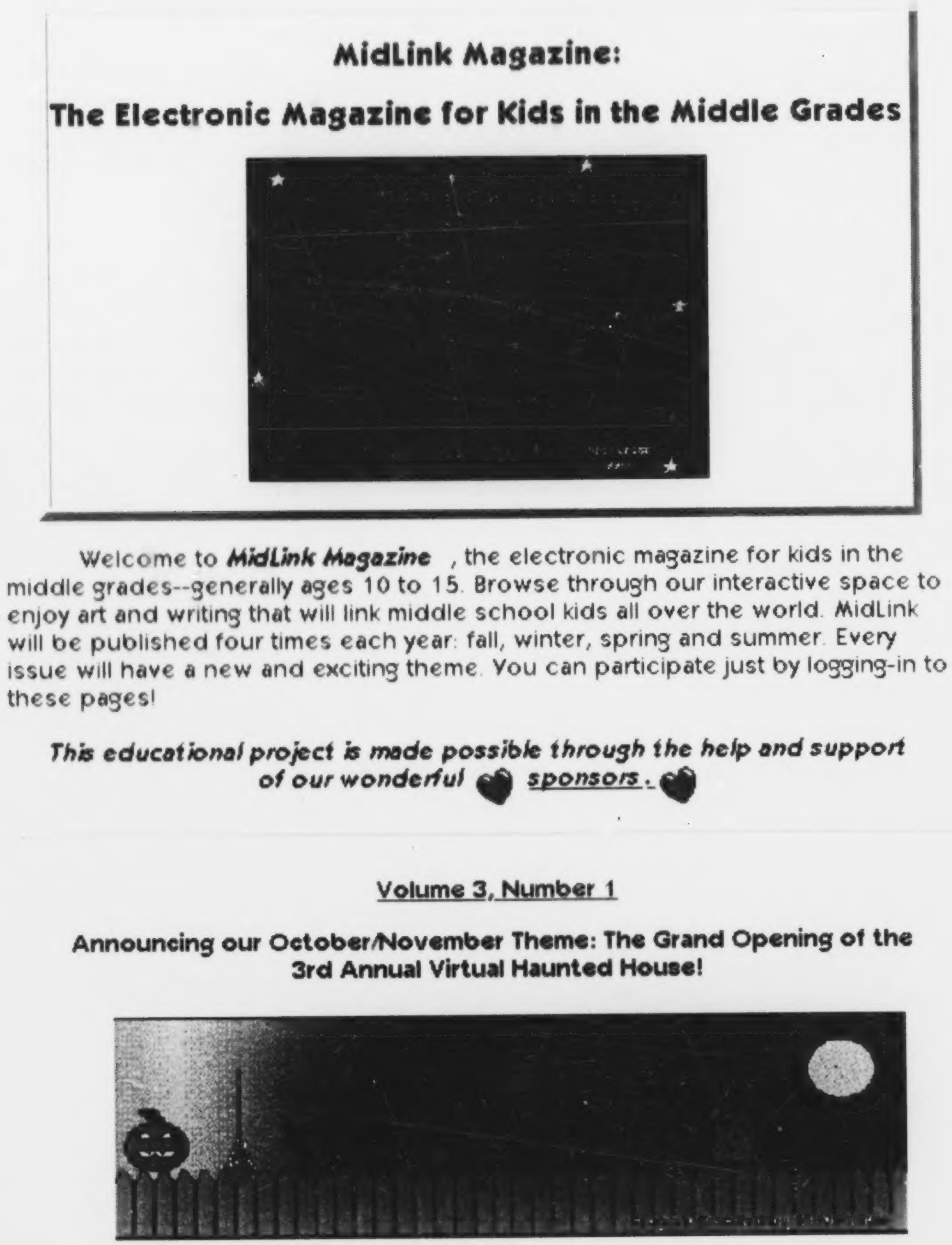
***Marlyn Kemper Littman**, PhD, is a professor at the School of Computer and Information Sciences, Nova Southeastern University, 3100 SW 9th Avenue, Fort Lauderdale, FL 33315: 954/475-7025; marlyn@scis.nova.edu.*

# Exemplary Web Site

Caroline McCullen

## MidLink Magazine

*http://longwood.cs.ucf.edu/~MidLink*



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**The Electronic Magazine for Kids in the Middle Grades**

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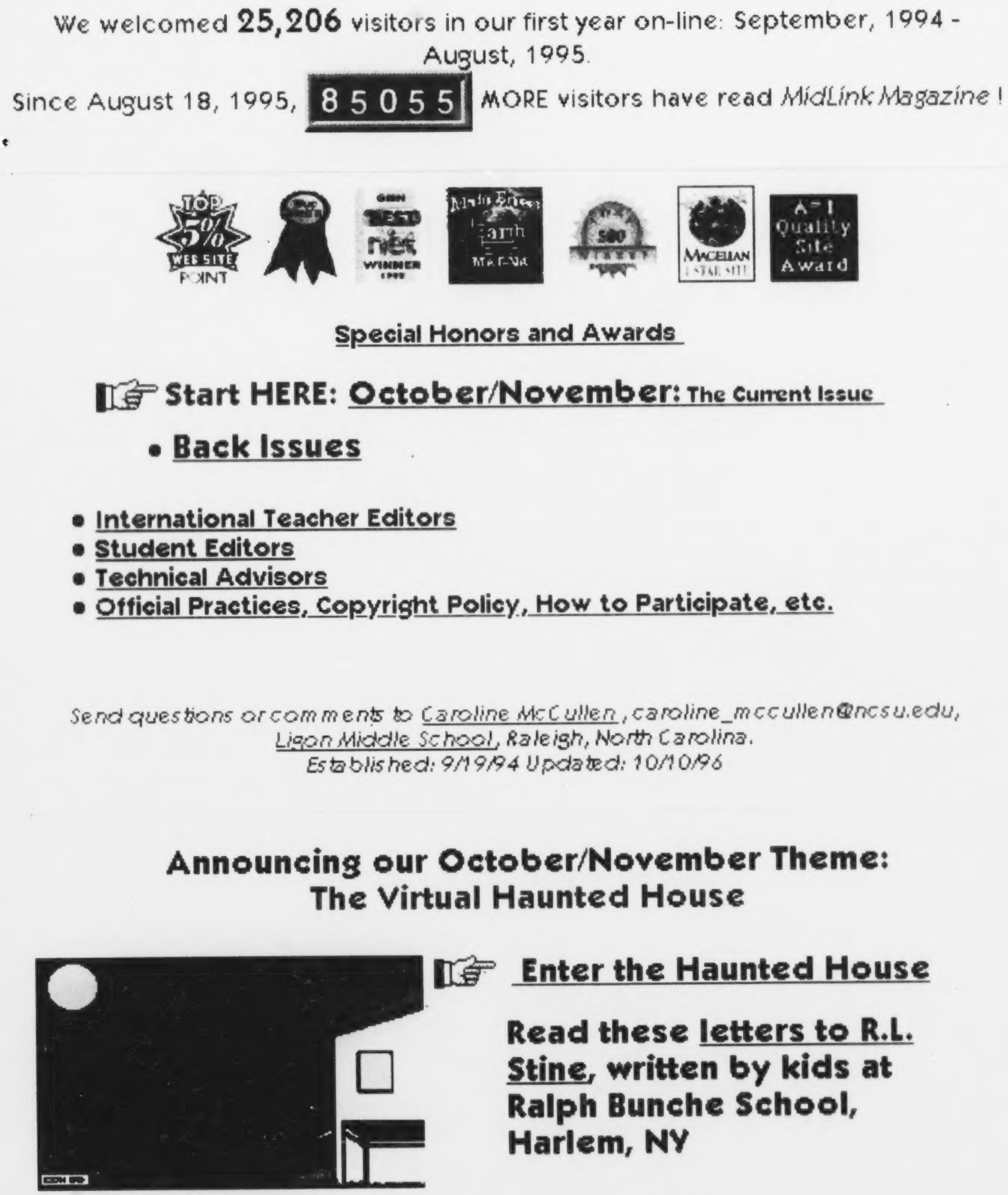
***This educational project is made possible through the help and support of our wonderful*** ***sponsors.***

**Volume 3, Number 1**

**Announcing our October/November Theme: The Grand Opening of the 3rd Annual Virtual Haunted House!**

63



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- **Student Editors**
- **Technical Advisors**
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*Send questions or comments to Caroline McCullen , caroline_mccullen@ncsu.edu, Ligon Middle School, Raleigh, North Carolina.*
*Established: 9/19/94 Updated: 10/10/96*

## Announcing our October/November Theme: The Virtual Haunted House

**Enter the Haunted House**

**Read these letters to R.L. Stine, written by kids at Ralph Bunche School, Harlem, NY**

**Are You a Return Visitor?**
**Use Our Quick Index to JET to**
**Your Favorite Ongoing Projects.**

**Are You New Here?**
**BROWSE Through Our Project**
**Summaries.**

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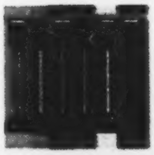
## Feature Projects



- **Character Counts! Character Counts: In October we celebrate *National Character Counts Week* . Tell us about people of good character in your very own neighborhood. Check out our growing list of role models...and share one of your own!**

HAIK S

- **Haikus: Join Mrs. Kang's 7th grade class as they write and illustrate their own Haikus. A Haiku is a form of Japanese poetry.**

- **Multimedia Portfolios About Authors Enjoy these HyperStudio Stacks about your favorite author Realtime! You can download the plug-in and play them in your web browser.**

- **Trashy SculptureJoin this art/science project started by kids in Columbus, Indiana. Make a sculpture out of solid waste, and learn while you're creating your masterpiece. Check outTrashasaurus Rex, who made an appearance at Nickelodeon Studios with this creative teacher!**

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## Quick Index of Ongoing Projects and All-Time Favorites

- 3-D Adventures! See our New! 3-D Model...It's a Web-O-Lution!
- Adventures in Time: Go on a thrilling ride in a Western Time Machine with Wyoming students.
- The BALDRIGE Sets Sail Sail the World's Oceans on the NOAA MALCOLM BALDRIGE. Read about the February teleconference with Captain Nelson. We had great time meeting our virtual friends!
- Best Web Sites These were picked by KIDS. A great place to start.
- Book Fair: The International Book Fair created by YOU.
- Book Link: Read about your favorite books and authors. Enjoy the New! multimedia portfolios in REALTIME!
- Character Counts! Read about people of Good Character...and add your OWN hero.
- Civil War Portfolios: Multimedia projects about the American Civil War New!
- Cool School Home Pages These middle schools are "Movers and Shakers".
- Creative Cuisine: Recipes Revisited
- Currency Comparison/Conversion Project -- Australia
- Desert and Desertification -- Israel
- Design An AlienDo this for fun, or do it as a science project!
- Electronic Elementary: The E-Link! The Electronic Magazine for Kids in the Lower Grades UPDATED
- Electronic Portfolios See the exciting results of Web research
- Environmental Issues: A Global Project from Hawaii
- Game Page Gaming Tips and Treats
- Global Rivers Project River Resources Galore!
- Global Skylines Shouldn't YOUR hometown be here??
- Olympic Activities Read about Olympic stars...and write about *YOUR* hero
- Pixel Over, Pixel Under A Virtual Weaving Exhibition
- Sports Page Read about your favorite sports stars.
- Surf the 'Net with middle schools around the world.
- The "Write" Spot! UPDATED New Poetry: Haikus from North Carolina

## People, Policies, and Practices of *MidLink Magazine*

This section tells how you can participate in our projects.

Editorial Policy
How can you join our projects?
Copyright Policy

**Lost Files?**
**MidLink Magazine Staff**
**Sponsors**
**Student Editors**
**Teacher Editors**
**Technical Advisors**

*Questions or comments to: Caroline McCullen, Ligon GT Magnet Middle School, Raleigh, North Carolina.*

**Last Revision: October 6, 1996**

MidLink Magazine's Home Page

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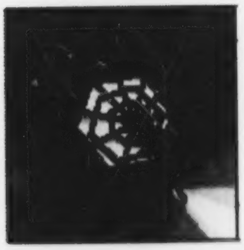
# Best Web Sites in Cyberspace



**These sites were picked by *MidLink Magazine* readers because they are educational, interesting, or just plain fun. We welcome** your suggestions

| | | |
|---|---|---|
| Museums, Math and Science | Reading and Exploring Fun Sites | Resources, Pointers and Libraries |
| Social Studies, Geography and Travel | Teacher Resource Section | Back to MidLink Magazine |

## Museums, Math, and Science

- Exploratorium, San Francisco **Explore the latest exhibits**
- Franklin Institute of Science Museum **Great exhibits, great resources**
- Hubble Space Telescope Images **View the latest images from the Hubble**
- The Geometry Forum
- The Jason Project
- MATH: KidsWeb: ****Ask Dr. Math!****

- Math Magic!
- Mega Math
- NASA: Today@Nasa **All the latest from NASA (formerly Nasa *Hot* Topics)**
- National Geographic Magazine On-Line
- National Hurricane Center's Tropical Prediction Center **Track the latest hurricane**
- The Nine Planets: A Multimedia Tour of the Solar System
- The Raptor Center **See *and* hear your favorite birds**
- Charlotte, The Vermont Whale **How did a whale get to Vermont??**

Back to Best Web Sites Menu

### Reading and Exploring: Fun for Kids

- Cyberspace Middle School
- The Electronic Zoo **A virtual collection of your favorite animals**
- KidsCom virtual playground: For KIDS Only! **You must have a personal e-mail address to play here.**
- Mr. Potato Head
- Paddy's Tree House **This is a site with almost 100 links to other cool sites. The host of the page has a likeable way of talking to young surfers!**
- Stone Soup **Web version of a great place for kids to publish their writing**

Back to Best Web Sites Menu

### Resources, News, Pointers, and Libraries

- I-Way 500 Home Page: The Top 500 Web Sites in Cyberspace - All are Rated and reviewed.
    - I-Way 500: Best Education Sites
    - I-Way 500: Best Children and Family Sites
- K-12 Educational Book Marks collected by Jan Wee
- Kidlink: Global Networking for Youth 10-15
- Kids Web - A Digital Library for School Kids
- NandO Times **A digital daily newspaper**
- The U.N. Voices of Youth Page **Give your opinion about Children's Rights, War, Homelessness, etc.**
- WRAL On-Line **News and Information Updated 24 hours a day**
- The Web66 Clickable Map of K-12 schools

Back to Best Web Sites Menu

## Social Studies, Geography, or Travel

- The American Civil War Home Page **at the University of Tennessee**
- American Civil War Resources **at Virginia Tech**
- The American Revolution: From Revolution to Reconstruction
- The CIA World Fact Book
- North Carolina Encyclopedia
- North Carolina History **(Includes information about Native Americans)**
- Thomas: Legislative Information on the Internet
- The Virtual Tourist **Includes regional world maps.**
- The Virtual Tourist II **World maps and additional information**
- The Whitehouse!
- The World Flags Page **Find almost ANY flag here by clicking on the first letter of the country's name!**

Back to Best Web Sites Menu

## Teacher Resources

- Academy One **National Public Telcommunications Network**
- Ask Eric Virtual Library **Do your educational research here!**
- Busy Teachers' Web Site **Organized by content area, includes lesson plans**
- Champion Middle School Partnership **Redesigning Middle Schools through Staff Development**
- Classroom Connect **Internet activities for your classroom**
- COSN Home Page **: The Consortium On School Networking**
- Global School Net's Web Tutorial **A great resource for new "web weavers!"**
- InQuiry Almanack **On-Line Journal of the Franklin Institute of Science**
- MEGA: **Middle Educators Global Activities: An new resource for middle school teachers**
- MiddleWeb**: Resources concerning middle school reform with a special focus on urban middle schools.**
- SAMI Home Page**: Science and Math Initiatives--A wealth of information about grants, special programs and more**
- Technology & Learning Magazine **: The On-Line version of your favorite technology magazine**
- What's New at Web66? **Updated Daily! All the newest Web activities for K-12 educators.**

Back to Best Web Sites Menu
Back to the Ligon Home Page
Return to MidLink Magazine

# ■ Web Wanderings

*Paola Williams*

Whether you are a computer teacher or a subject-matter teacher, providing opportunities for your students to develop multimedia projects has a number of benefits. The focus of this column will be on how to manage student multimedia projects in the design of content-based Web pages. In addition to providing some techniques in management, I'll provide some resources on the Web for teaching and learning HTML document production.

Unless you have unlimited access to technology, it is a good idea to put students in pairs. In many instances a team approach might be most desirable because it mirrors the way work is commonly done in commercial multimedia production. Teaming allows for student collaboration in collecting the information and resources they need to develop a product. In addition it fosters multiple intelligences and encourages students to become actively engaged in their own learning.

Once students have collected their "assets" or "content," they will need to become familiar with the authoring tool they will be using. Because we are selecting Web pages as the production mode, a knowledge of HTML language is necessary. Some excellent resources for teaching html documentation can be found at the following sites.

### EdWeb

***http://edweb.cnidr.org***

EdWeb is a great site for finding out about educational reform using the World Wide Web. The pages on web development are excellent.

### A Beginner's Guide to HTML

***http://www.ncsa.uiuc.edu/General/Internet/WWWHTMLPrimer.html***

This is a primer for producing documents.

### How Do They Do That With HTML?

***http://www.nashville.net/~carl/htmlguide/index.html***

This site shows and teaches many principles of Web design, from simple to the bizarre, difficult, and experimental.

### Bare Bones Guide to HTML

***http://werbach.com/barebones/barebone.html***

This concise and informative guide lists all the tags for the most current browsers.

### Web Style Manual

***http://info.med.yale.edu/caim/StyleManuel_Top.HTML***

This site describes the design principles used to create Web pages.

### Web66

***http://web66.coled.umn.edu/cookbook/HTML/MinutePrimer.html***

The Eight Minute HTML Primer gives directions to help you learn how to design Web pages in eight minutes.

### Writing HTML

***http://www.mcli.dist.maricopa.edu/tut/***

This site is designed to help teachers create learning resources that access information on the Internet.

All of the sites mentioned have links and resources of their own. Browsing through this information can be time consuming; therefore, it is wise to be selective and narrow in your choices. Find a simple place to begin and start making Web pages with your students. As you begin to need more elaborate commands, you will have resources available to you.

Use your students as assistants. Many students from the middle grades through high school are already experts. They can be of great assistance to you in getting your project going.

Most articles and books on multimedia development suggest that you demonstrate the program you are going to expect them to use. Provide examples of good Web pages from the Internet. You can actually print out some pages and put them on an overhead, or go online and browse the Web, showing pages you find interesting and appropriate to your project.

It is a good idea to start simple and then add complexity. Give your students minilessons on Web tags. You can actually have them plan and storyboard their entire page-development process on paper. Then they can use a simple text editor to enter their data, adding graphics as they go. Adding the tags should come after they have some worthwhile information.

I encourage my students to do original art and graphic design rather than scanning other people's work. I will not publish their pages unless it contains original artwork as well as content. In order to ensure good planning, I require students to write a proposal of what they are going to produce. Along with their rationale for doing their particular topics, I require references and resources. Later, when they are rushed to complete their projects, they have a record of resources they used.

Finally, I arrange for my students to share their projects with their classmates. Publishing for a wider audience is a real motivator. If their work meets high standards and they want to be published, I look for electronic publications that want to publish student work. As a contributing editor for MidLink Magazine (http://longwood.cs.ucf.edu/~MidLink/), I can tailor my projects to meet MidLink's publishing schedule. (The previous column, "Exemplary Web Site: MidLink Magazine," showcases the current issue of this online magazine.)

Anything that is worth doing takes planning. Developing multimedia projects with students is time consuming and demanding for both the teacher and the participants. But, it is worthwhile because it makes learning meaningful and important.

***Paola Williams**, SIGHyper Chair, Punahou School, Honolulu, HI 96825; pwilliam@lava.net*

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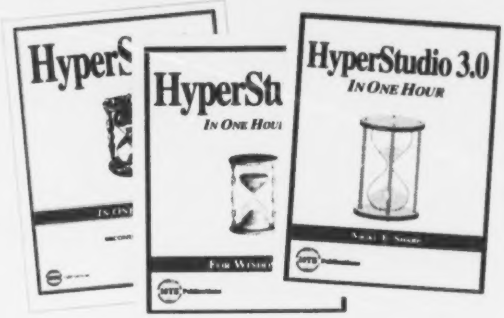

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*HyperNexus: Journal of Hypermedia and Multimedia Studies* is the journal for the SIG. Published quarterly, *HyperNexus* brings together new ideas, new ways of thinking, and prominent voices in the area.

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## Submission of Manuscripts

*HyperNexus* is published quarterly by the International Society for Technology in Education Special Interest Group for Hypermedia and Multimedia. *HyperNexus* seeks articles on K–12 and college instructional applications of hypermedia and multimedia in teacher presentation and student learning. Case study product reviews are welcome.

Two double-spaced hard copies of manuscripts with screen dumps and an ascii file (noting platform and wordprocessor used) should be sent by land mail. Include your name, address, phone, and e-mail address. Receipt of manuscripts will be acknowledged electronically.

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# HyperNexus

## Journal of Hypermedia and Multimedia Studies

Volume 7 Number 3 April 1997

JL 3/25/97
DGM
JL
ORYX

**In This Issue:**

**Web-Based Learning Activities**
**Creating HyperStudio Stacks**
**Planning Intranet Implementation**

# HyperNexus Volume 7 Number 3

**Publisher**
International Society for Technology in Education

**Editor-In-Chief**
Gertrude (Trudy) W. Abramson, EdD
School of Computer and Information Sciences
Nova Southeastern University
954/262-2070
abramson@scis.nova.edu

**Contributing Editors**
George K. Fornshell, PhD
School of Computer and Information Sciences
Nova Southeastern University
gforn@scis.nova.edu

Marlyn Kemper Littman, PhD
School of Computer and Information Sciences
Nova Southeastern University
marlyn@scis.nova.edu

Paola Williams
Punahou School
Honolulu, HI
pwilliam@lava.net

**Publications Coordinator**
Jennifer Roland, *ISTE*

**Editorial Assistant**
Anne Rothlisberger, *ISTE*

**SIG Coordinator**
Dave Moursund

**SIGHyper Board of Directors 1996–1997**
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*pwilliam@lava.net*

George Fornshell
*gforn@scis.nova.edu*
*954/476-8945*

Mark Horney
*mhorney@oregon.uoregon.edu*

Caroline McCullen
*caroline_mccullen@ncsu.edu*

Marilyn Nagano Schlief
*mschlief@nea.org*

Susan Veccia
*svec@loc.gov*
*202/707-6151*

Trudy Abramson, *Editor-in-Chief*
*abramson@scis.nova.edu*
*954/262-2070*

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## ■ The Editor's Pulpit

Trudy Abramson

# Educational Applications of Cutting-Edge Technologies

### HyperSIG or SIGHyper?

In the first issue of this volume, we wrote about our SIG's name. Apparently, the powers that be have come to a decision. Henceforth, we shall be known as HyperSIG because that is the name in our bylaws.

### Meet Marilyn Schlief

HyperSIG is pleased to announce an illustrious addition to our Board of Directors. Marilyn Nagano Schlief is the senior program officer at the National Foundation for the Improvement of Education (NFIE) of the National Education Association in Washington, DC. She is the senior program officer for the Road Ahead technology grant program, a special two-year endeavor funded by the proceeds from Microsoft Chair Bill Gates' book, *The Road Ahead*.

Marilyn has taught K–12 general and special education classes in Michigan and Japan. She received the Christa McAuliffe Award for cross-cultural classroom telecommunications programs among students in Michigan and Japan.

Write to Marilyn at MSchlief@nea.org.

### Call for Participation

Although the rush of improved hardware, software, and applications persists, the plea for appropriate and sufficient teacher training in the use of classroom technologies goes (largely) ignored. *HyperNexus'* appeals to classroom teachers whose pupils use authoring systems as creative-expression learning tools continues to come up empty-handed. Are teachers so busy that there is no time to write? Is it possible that despite all the press about constructivist classrooms and performance-based assessments, most work is still performed in the traditional mode? We repeat our request. Teachers, send us your students' work and a phone number. We will call you and write the expanatory text to surround the applications. In case you may notice, we had to call on our editors for contributions so that we could publish an engaging issue in good time.

### In This Issue

In this issue, we are pleased to present articles that address the cutting-edge technologies of intranets, virtual reality classrooms, and two learning-oriented multimedia Web sites. In addition, we feature two HyperStudio articles written by people who work closely with classroom teachers.

**Peter Laspina** is the owner and creator of a Web site called Music Educators' Resource Links. The subject is K–12 classroom music education and the audience is classroom teachers or students in pre- and inservice music education courses. Because of space limitations, we are printing only his home page, and two parts of the site. The rest may be visited online. This Web site reaches out beyond the inservice teachers with whom Peter usually works to interested people he has not met and probably never will. You can access this site at http://www.li.net/~plaspina/.

**George Fornshell**, a contributing editor, is the author of a very different kind of Web site. "Who's Who in Fall Cluster 1996" was created for and with members of a distance learning class. This site, always accessible in cyberspace, provides a great deal of useful information. The objective of the site is to encourage meaningful collaborative discussion and work among doctoral students who may seldom, if ever, get to interact face to face. This is the type of work that one might expect to find on an intranet. You can view this site at http://devel1.scis.nova.edu/~gforn1/735demo.

Talking about intranets, **Marlyn Littman**, our contributing editor who is always investigating cutting-edge technologies, has written "Intranet Use in the Learning Environment: Challenges and Prospects." This article is an excellent introduction to the new technology; it provides opportunities for discussion and reflection.

**Ellen Vasu** presents a tutorial, "Asking Questions and Giving Simple Feedback in Multimedia HyperStudio Stacks." HyperStudio, an authoring system for both Mac and PC platforms, is probably the most popular one used in K–12 schools today. This article will help users extend their development skills into new territory.

On the subject of HyperStudio, **Kevin Andreyo**, our Mac guru, provides "HyperStudio Express: A Book Review." This book is a gentle introduction to authoring in HyperStudio for the 3.0 Mac for teachers and their pupils. Kevin plans to review the PC version of the book in future issues.

**Donald Sanders** has written "The Virtual Past in the Present and Future Classroom." To the best of our knowledge, we have never before published a "vendor presentation." However, this work is so cutting edge, so well written, and so chock full of information of interest to HyperSIG readers, that here it is.

**Paola Williams**, HyperSIG Chair, is happily anticipating the end of the school year and the arrival of the 1997 National Educational Computing Conference in Seattle, Washington. As always, she shares some of her Web "findings" with our readers.

## Contest Reminder

We wish to remind all of our readers the judgment day for our interactive software contest is approaching rapidly. If your work has not been submitted to date, as per the call for participation in volume 7 number 2, please let us know by e-mail that it is on the way.

We look forward to greeting all SIG members at NECC '97 and to having a standing-room-only contest presentation and elections meeting.

***Trudy Abramson**, Nova Southeastern University, School of Computer and Information Science, 3100 SW 9 Avenue, Suite 522, Fort Lauderdale, FL 33315; 954/262-2070; abramson@scis.nova.edu*

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# Message From the Chair

Paola Williams

As the school year begins to wind down, teachers turn their attention to planning their summer activities. Summer is a time to reflect, revise, and revitalize. Some do this by spending time in the garden, going to the beach (a big item here in Hawaii!), and also by joining various activities that lend themselves to professional development.

Perhaps we can do all three activities by extending our own learning and hopefully pass on our new knowledge or skills to our students. One way of getting a big chunk of new knowledge or honing a skill is by attending a conference on technology. So, of course, I hope all the readers of *HyperNexus* have already sent their registration forms in for NECC '97 Potlatch in Seattle, Washington. For more information about the conference, you can find updates at their Web site (http://www.wce.wwu.edu/necc97).

Other ways of honing skills and learning new things is to take a class or join a workshop. Good places to find workshops and classes are through local technology organizations. Many of these organizations are affiliates of national organizations. For example, Tech Corps is a national organization of volunteers assisting schools throughout the country with technology efforts. Tech Corps volunteers are men and women with technical expertise who share their knowledge with schools to assist educators in their efforts to advance the use of technology in education. If you are interested in reading more about Tech Corps and its affiliates you can access the Tech Corps Web site at http://www.ustc.org

If you like to participate in lively discussions, read interesting articles written by other educational professionals, and find the best possible sites on the Internet for your students to investigate, the best place to spend some time is The Well Connected Educator. It is funded by a Networking Infrastructure in Education grant from the National Science Foundation; technical support is provided by Microsoft and the Global SchoolNet Foundation and its creator and director is Gwen Solomon. The URL is http://www.gsh.org/wce.

Sometimes the best learning takes place when we least expect it. Peter Schwartz (1991) recommends making the time to read outside of your immediate specialty. I regularly scan the newsstand in my local market for new finds. One that has been a wonderful find is *Fast Company* ... a *Rolling Stone* and *Wired* for the business community. The articles are geared toward business and technology, but it is a wonderful window into organizational learning and new leadership models. I highly recommend it for your own learning.

Enjoy this issue of *HyperNexus*. Stay connected to your colleagues, learn something new and interesting, and then in September, share your new skill or knowledge with someone else.

aloha
Paola Williams
Chair, HyperSIG

## Reference

Schwartz, P. (1991). *The art of the long view*. New York: Doubleday/Currency.

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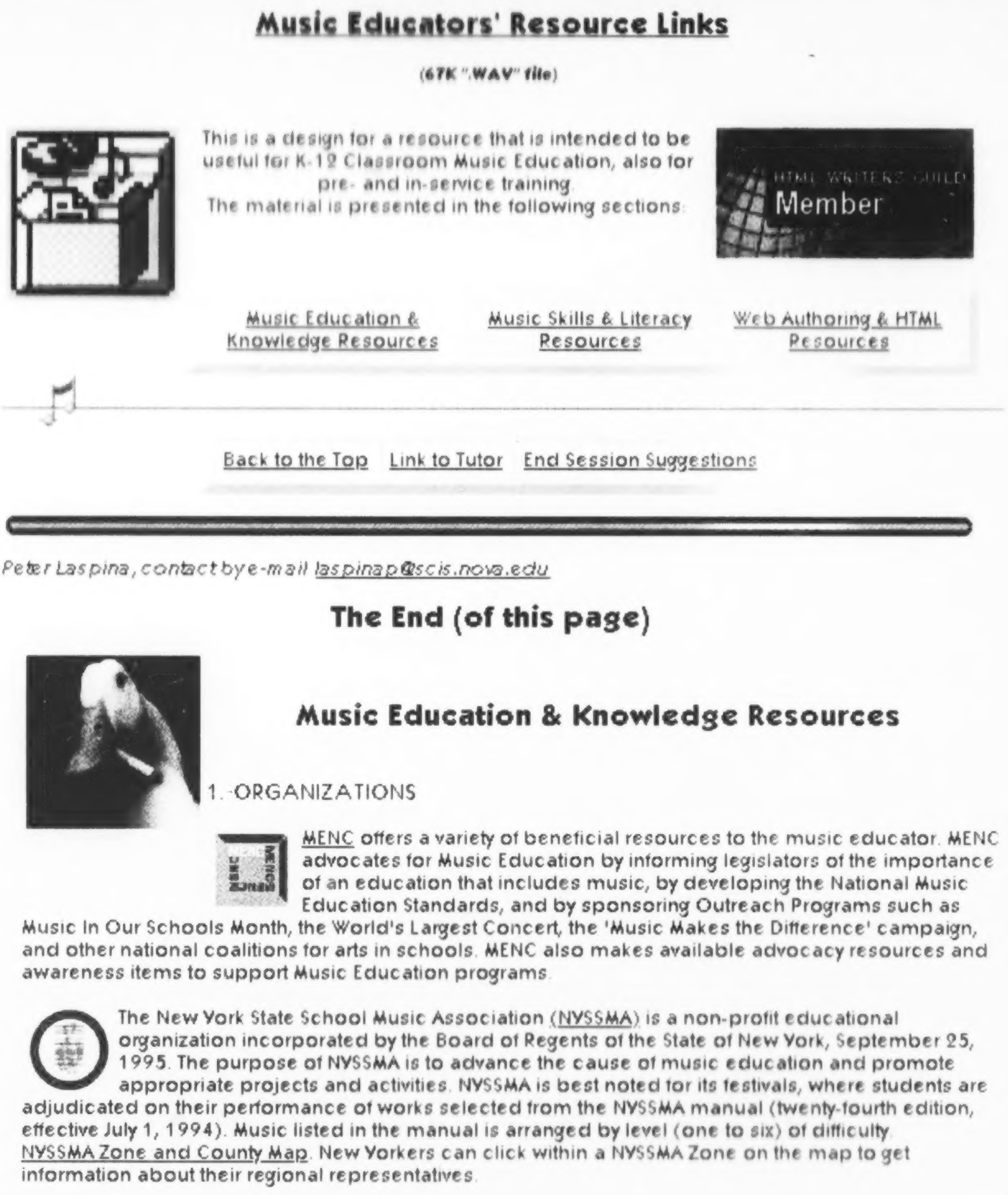
# ■ Exemplary Web Site

*Peter Laspina*

## Music Educator's Resource Links

***http://www.li.net/~plaspina/***



**Music Educators' Resource Links**

**(67K ".WAV" file)**

This is a design for a resource that is intended to be useful for K-12 Classroom Music Education, also for pre- and in-service training.
The material is presented in the following sections:

Music Education & Knowledge Resources | Music Skills & Literacy Resources | Web Authoring & HTML Resources

Back to the Top | Link to Tutor | End Session Suggestions

*Peter Laspina, contact by e-mail laspinap@scis.nova.edu*

**The End (of this page)**

**Music Education & Knowledge Resources**

1. ORGANIZATIONS

MENC offers a variety of beneficial resources to the music educator. MENC advocates for Music Education by informing legislators of the importance of an education that includes music, by developing the National Music Education Standards, and by sponsoring Outreach Programs such as Music In Our Schools Month, the World's Largest Concert, the 'Music Makes the Difference' campaign, and other national coalitions for arts in schools. MENC also makes available advocacy resources and awareness items to support Music Education programs.

The New York State School Music Association (NYSSMA) is a non-profit educational organization incorporated by the Board of Regents of the State of New York, September 25, 1995. The purpose of NYSSMA is to advance the cause of music education and promote appropriate projects and activities. NYSSMA is best noted for its festivals, where students are adjudicated on their performance of works selected from the NYSSMA manual (twenty-fourth edition, effective July 1, 1994). Music listed in the manual is arranged by level (one to six) of difficulty. NYSSMA Zone and County Map. New Yorkers can click within a NYSSMA Zone on the map to get information about their regional representatives.

Music Education Resource Links (MERL)
University of the Pacific School of Education
This music education homepage is organized to provide links to curriculum resources for each of the nine national content standards as presented by the National Standards for Art Education. A variety of documents describing what students should know and be able to do in the arts are available on-line through Artswire and MENC. The document, "The School Music Program: A New Vision," is intended for everyone who is interested in the quality of music instruction in America's schools.

## 2a COMPOSERS and PERFORMERS - Traditional

For lovers of Johann Sebastian Bach a visit to the J.S. Bach Home Page will be worth the trip. This site appears to include pointers to everything available on the Net about Bach, including listings of his works, MIDI files of his recordings, and a calendar of upcoming events related to his music. The site is searchable, and the works can be browsed by category, title, year, instrument and title, instrument and year, BWV number, or even by key. The Recommended Recordings section is organized by title, conductor or performer, instrument, BWV, record label, and recent submissions. Also available are links to biographies, photographs, literature, and other sites offering resources on Bach.

The LUDWIG moderated discussion list is devoted to the life and musical compositions of the great German composer Ludwig van Beethoven. To subscribe, send email to: Listserv@sjuvm.stjohns.edu

```
In the BODY of the message type:
     SUBSCRIBE LUDWIG yourfirstname yourlastname
```

CHOPIN-L is a public, unmoderated mailing list devoted to issues related to late classical and romantic piano literature and its composers, with a focus on piano. Topics related to individual composers, leading performers or influential pedagogues are encouraged. For example, issues in any way related to piano performance, including editions, performance problems and practice(s), performance tradition(s) or historical pianos would be appropriate. Dialogue on any aspect of the wealth and variety of nineteenth century piano repertoire are welcomed. Discourse on biographical and historical issues of this period is invited. Discussion regarding an individual composer's compositional style, or the "Romantic Style" in general, and its influence on later generations is welcomed. To subscribe send email to: Majordomo@earth.ColState.EDU

```
In the body of the message type:
     SUBSCRIBE CHOPIN-L
```

## 2b. COMPOSERS & PERFORMERS - Modern

The Beatles Anthology page offers links to online information about the "Fab Four."
The Anthology companion Web sites by ABC and Capitol Records, the Life magazine special edition, memorabilia sites, newsgroups, discographies, book reviews, and about 40 more sites for both reminiscing and reading about their current project.

The Ultimate Band List claims to be the Web's largest list of interactive music links. Bands can be browsed alphabetically, by genre (including pop rock), hard rock, jazz, new age, and dance/techno/rap, or by Internet resource. Information on each band may include discographies, lyrics, audio, guitar tablatures, mailing lists, and Web connections.

Composers in Electronic Residence (CIER) has created a WWW, teacher-run electronic community that can link you with experienced composers and other music students.

## 3. GENRES

The Folkwatch list is to serve as a means of communication for the folk and traditional arts, dance, and music communities. Appropriate topics for this list include but are not limited to: discussions of political, social, and economic factors affecting the promotion and sustenance of the community; announcements and discussions of activities intended to create a stronger sense of unity within the community; and announcements and information regarding resources and events of interest to the community. To subscribe send e-mail to majordomo@ac.net

```
in the body type:
     subscribe folkwatch
```

The Rock Guide Rolling Stone magazine and Magellan have joined to create this Internet rock resource directory. Whether you want to find out about an artist or a genre of music, obtain tickets for a show, or even gather information on starting your own music career, this site is an excellent starting point. Content is contributed by Rolling Stone, but the structure is similar to Magellan. The Rock Guide consists of Internet resources that are categorized, reviewed, and rated. Users can browse by genre or search the directory. There are sections on artists, music genres, magazines, books, merchandise, musical instruction, the music business, performances, clubs, online chat and discussion and more.

## 4. RELATED ARTS

One of the highlights of the Dance Links Web site at Purdue University, compiled mainly from information provided by dance videographer Amy Reusch, is a collection of pointers to over 150 U.S. University Dance departments, as well as departments in Australia, Canada, Finland, Ireland, and the United Kingdom. Dance Links also points to resources related to dance companies, performance listings, publications, organizations, funding, dance schools, dancers, and other dance indexes.

The National Endowment for the Arts (NEA) has recently opened a Web site, consisting of three parts: a guide to the NEA with an overview of the grant making program that includes applicant guidelines and information, as well as a hyperlinked list of state and regional arts organizations; an arts resource center listing NEA publications, information about international funding opportunities, and a large listing of arts service organizations in over 20 subject categories; and "arts.community," an online NEA publication that contains features such as a focus on a particular community, a featured artist, a writers corner, and endowment news, as well as links to other arts related sites.

American Variety Stage: Vaudeville and Popular Entertainment 1870-1920. The Library of Congress has recently added a wonderful exhibit on popular culture to its American Memory collection. American Variety Stage presently includes English and Yiddish language playscripts, theatre playbills and programs, over 60 movies, and photographs and memorabilia about Harry Houdini, the famous magician and escape artist. As befits the LOC, these collections are extensively cataloged, and can be searched by keyword or browsed by author, subject, or title. For text and illustration material, it is necessary to download images of pages, which are made available one page at a time. Unfortunately, LOC has made these images available in TIFF format, which is not supported by standard browsers. So while the collection is quite accessible from a searching and browsing viewpoint, it is more difficult and inconvenient to actually view much of what is here. That said, the contents of the exhibit makes them more than worth the trouble.
Click here for Image Viewer Information.

## 5. RESEARCH SITES

The Library of Congress recently redesigned its web site. Users will find easy access to Thomas (legislative information), the LC catalog, US Copyright Office information and publications, library exhibitions, and all library services. Featured on the site is "American Memory: Historical Collections for the National Digital Library." The collections can be searched, or the user may access them by type:

prints and photos, documents, motion pictures, and sound recordings. Educators should visit the "Learning Page," which provides information on using the materials in the American Memory collections, lesson plans, a tutorial, and links to related web pages are provided.

At the heart of A&E Television Network's Biography web site is a searchable and browsable online collection of 15,000 cross-referenced biographies (provided by the Cambridge Biographical Encyclopedia). The site provides the full text of selected opening chapters and reviews from best selling biographies, a quiz and anagram game, chatboards, and schedules of upcoming episodes of the Biography television program.

PIANOFORTE is a Classical piano mailing list. PIANOFORTE is a forum of discussion for classical piano amateurs, students, teachers and performing professionals.

Eyeneer Music Archives [AIFF, .wav, QuickTime] seeks to make comprehensive information about music publicly available. The site is divided into four main music genres: international, modern jazz, contemporary classical, and traditional American music. Creater Steve Bahcall says, "In each section you will find an ever-growing array of background info, biographies, discographies, new releases, photos, QuickTime video, and sound samples." A highlight of the site is a selection of sound samples that allows listeners to this site to hear an eclectic collection of music, from a wooden trumpet of Banda people of the Central African Republic to a 78rpm recording of Mississippi Delta blues singer Charley Patton.

## 6. TEACHER RESOURCES

Diversity -- K-12 Teachers looking for ways to incorporate more diversity into their curricula can browse through this list of resources to find information on everything from the Amish to the Pygmies of Zaire. The "General Sources" listing offers links to Internet sites concerned with diversity issues. Although most are annotated, the list items are not arranged in any particular order. The other links on the page are grouped into categories: disabilities, migration and immigration sources, Jewish resources, Asian American, African American, Women's Studies, Native American, and Hispanic. An additional feature is "The Cultural Landscape," which gathers links relating to the functions of communities, whether rural, urban, or suburban. This page is part of History/Social Studies Web Site for K-12 Teachers, which offers a range of other resources as well.

Teachers Helping Teachers, provided by a California middle school instructor, provides ideas and tips in the form of lesson plans and classroom activities. The content has been submitted by teachers for teachers. The site is designed to be an aid to teachers in K through 12, and provides ideas for classroom management, language arts, math, science, social studies, the arts, and special education. In addition, there is a topic of the week, and a selected list of other educational pointers in various subjects.

## 7. JAZZ

The History of Jazz site, developed by Dan Morgenstern, director of the Institute of Jazz Studies at Rutgers University-Newark, chronicles the birth and development of this art form via a series of short essays arranged in chronological order (although the order is not made explicit). Topics include the birth of Blues, Big Bands, and Jazz today, as well as various personalities who have made Jazz what it is. Morgenstern also supplies a recommended listening and reading list.

As saxophonist Benny Carter approaches his ninetieth year, a web site that pays tribute to this jazz pioneer brings his career to the Web. The site includes a selected discography (all currently available on CD) and many photographs of the musician's life and career, as well as information about recent and upcoming tributes and live appearances. There are links to other Web resources about Benny

Carter, and the site itself is well designed and easy to navigate. Duke Ellington once wrote, "The problem of expressing the contributions that Benny Carter has made to popular music is so tremendous it completely fazes me, so extraordinary a musician is he."

The Jazz Photography Of Ray Avery Web Site at the University of California - Irvine offers a multimedia collection of information about jazz in the U.S. during the middle of this century. There is a short introduction, "Jazz: The 1950s - Records & Photography," which traces the growing popularity of jazz through magazine articles from this period and provides some historical anchors to the jazz scene of the mid 1950s. A brief biography of Ray Avery provides some background information on his career. A separate catalogue of publications and exhibitions lists Ray's photography credits. The initial exhibit of photographs focuses on his early work from the 1950s. The exhibition is grouped into four major areas: The Lighthouse All Stars - Hermosa Beach & Laguna Beach; Nightclubs, Festivals & Concerts; Recording Sessions - Los Angeles; and Stars of Jazz - TV Series. Also offered is a collection of books and CDs that complement this period and feature releases of music recorded at the time and place that many of the photographs were taken.
The University of California - Irvine, website also includes more traditional musical forms.

Klub Kaycee's Kansas City Jazz in the 1920s and 30s, presented by the Miller Nichols Library, University of Missouri-Kansas City, in cooperation with kansascity.com and the Kansas City Star newspaper, is highlighted by a "Soundbyte" section, where, with the aid of RealAudio 2.0, users can listen to (approximately 30-second) jazz recordings provided from the holdings of the library. Included are over 35 recordings from 1916 to 1954 by artists including Count Basie, Euday Bowman, Duke Ellington, Charlie Parker, and Jay McShann's Kansas City Stompers, among others. The site includes short biographical sketches of over 25 jazz artists important in the Kansas City jazz scene in the 1920s, 30s, and 40s, ranging from Edward Emanuel Barefield to Lester Young, each of which contains a short bibliography. There is also a section on nightclubs, ballrooms, and outdoor pavilions where the music flowed, as well as an "Articles" section containing a jazz bibliography and glossary.
Click here for a Less graphical site.

## 8. OPERA

The following *Opera Sites* are all cited in:
Miller, S.B. (1996, April 28). Of star worship and flame wars. The New York Times, p. 33
The New York City Opera
Opera Glass
Opera Homepage

Opera Software, a Norwegian company, has made its Internet browser *Opera* available for evaluation. It is Windows 3.X based software (also runs on Windows 95 and OS/2 with Windows support), and will run with as little as a 386SX PC (8 megabytes of RAM recommended). One significant feature is the ability to fetch multiple documents and images at the same time, allowing the user to tile or cascade the documents. It contains full keyboard interface and supports the complete HTML 2.0 specification and many HTML 3.2 extensions. The download size of the English file is less than 900 Kilobytes. The browser is available in Norwegian and Swedish as well. Pricing information is available at the site.

## 9. EMERGING TECHNOLOGIES

The Brain Opera
Interact with the Brain Opera
Live Brain Opera Broadcasts
Text-only information
Produced by Tod Machover and the MIT Media Laboratory, the Brain Opera was an interactive real and cyber event that ran from July 22 to August 3, 1996 at Lincoln Center in New York. The Brain Opera site was highlighted by a series of Java applets that allowed Internauts to experiment creating their own computer-enhanced music, just as the attendees did at Lincoln Center. The "Interact with the Brain

Opera" page allowed users to play the "Rhythm Tree," "Cyber-Metal," "Multi-Rhythm-Bouncer," and also participate in the Opera itself by playing "The Palette." Interactions were received by the performance computer and translated into music for the live audience. During the show (which ran from 2:00 to 9:00 p.m. EDT), selected performances were broadcast live via Xing SteamWorks and MBONE. The Brain Opera is a technically advanced site that demands a Java-enhanced browser, audio and video streaming software, and only the fastest of connections. It is also graphically beautiful, but in no way easy or intuitive to navigate. An original experiment in interactive art, it is fascinating and well worth investigating.

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## The End (of this page)

## Music Skills & Literacy Resources

1. LISTENING

The World Wide Radio (WWR) is the best way for people to stay in touch with some of the hottest new bands from throughout the world. Audio clips and biographies are available for most of the bands listed. Also, you can order CDs or cassettes for most of the bands listed.

RG (Rare Grooves):
A tipsheet (ala Billboard) for techno, house, and hip-hop music. View charts, regional information, playlists, and most importantly, hear bits of songs (~10 seconds).

The Internet Jukebox, provided by CDNow, makes it possible to listen to entire CD's over the Internet if your computer is enabled with the necessary hardware. The Internet Jukebox uses RealAudio 2.0 technology, which enables audio files to be played over 28.8 modems. CD's can be chosen from the categories of classical, pop-rock, alternative, and jazz and blues. While the quality heard over the Net is still not yet that of the CD player in your living room, the 2.0 version of RealAudio is a definite improvement over 1.0. If you like the CD, you can order it from CDNow on the spot.

Pop Sites, all taken from: *Surf's Up!*. (1996). BMG Music Service [Brochure]. Lawrence, KS: Author. Available on-line, (<--) by clicking here (<--).

Top40 Radio was located in the LUDWIG mailing list. This is a "classical" Top 40 list.

2. DISCUSSION

MELODIC-ROCK-DIGEST is a moderated discussion focusing on music that is electric- or acoustic-based, intelligent, and melodic. It doesn't discuss thrash, rap, industrial, punk, metal, goth, or pure folk. In general, it doesn't discuss music that is image-conscious. It may be edgy, it may be heavy, it may even be folky, or it may simply be rock and roll. This list likes to hear from both musicians and listeners. It encourages posts about the business of music, reviews of live shows and recordings, personal experiences in the music industry, or announcements about people and places that may be of interest to the rest of us. This is not a place to bash musical styles or tastes, nor is it the place for shameless self-promotion. Note: this discussion list is available only in digest form. To subscribe send email to: majordomo@automatrix.com

```
In the body of the message type:
     SUBSCRIBE MELODIC-ROCK-DIGEST Your E-mail Address
```

## 3. SOFTWARE SITES

**Help Rooms**
RealAudio Download
How To
Setup FAQs
Setup Tips
Check here first

Shareware.com is a new service from clnet: the computer network that features the Virtual Software Library (VSL) search engine. "You can search for, browse, and download the best software -- including freeware, shareware, demos, fixes, patches, upgrades -- from the top managed software archives and computer vendor sites on the Internet." At present, there are over 150,000 files in the archive. The site also offers an e-mail newsletter to keep current on new additions.

## 4. PUBLIC DOMAIN

Savetz's Unofficial Internet Public Domain Index contains pointers to works that are in the public domain. As clarified by Mr. Savetz: "Public domain doesn't mean 'shareware.' It isn't a work that is owned by somebody else, who allows you to use it for free. It isn't software distributed under the 'GNU Public License' or a copyrighted book that the author has put online. Public domain means that the creator of the work, with no strings attached, has given up all rights to the work. It means that you may do anything with the work that you want - read it, publish it, put in on CD-ROM, change it."

Back to HomePage Link to the Tutor End Session Suggestions

**The End (of this page)**

# Who's Who in Fall Cluster 1996

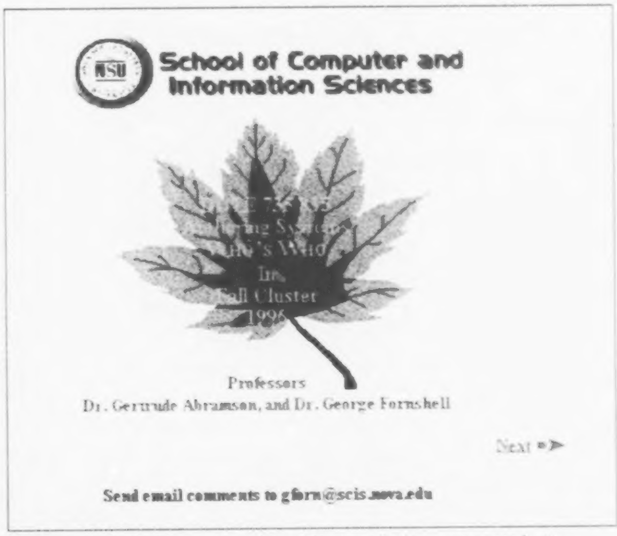
*George K. Fornshell*

This Web site provides information about the students enrolled in a distance learning doctoral course in computing technology in education. These students have opted for a "cluster" format: They come to the main campus for a weekend at the beginning of the six-month term and for a second meeting at the midpoint. Trudy Abramson and I have received permission from our dean, Edward Lieblein, to team-teach courses in authoring and courseware design.

We use a variety of electronic tools to reach out to our students and to encourage them to participate in online discussions. Although most students readily communicate with us online, only about 25% of each class contributes to the group venues. To encourage greater participation and recognition, I have created a multimedia Web site that provides "Who's Who" information about each student that should be useful to all students in the class.

## Web Site Description

The splash page of the site is like the cover of a book: It says just enough to let readers know that they are in the right place (see Figure 1). The second page is a "main menu" of thumbnail images (see Figure 2). A picture of each student is linked to that student's individual Web page. Each student's Web page contains information that we believe will encourage intergroup communication. At the bottom of each page, except the splash page, are arrows that that enable Web site navigation from page to page and back to the "main menu page." Figure 3 shows a sample student Web page.



School of Computer and Information Sciences

Professors
Dr. Gertrude Abramson, and Dr. George Fornshell

Next

**Send email comments to gforn@scis.nova.edu**

*Figure 1. "Splash" page of the Who's Who in Fall Cluster 1996 Web site*

We decided that near-photographic-quality images were necessary to help everyone put the names and faces together following hectic weekend meetings. After getting everyone's permission, I used a VHS video camcorder to capture images of the students. The video image recording took place while Trudy conducted the class. No one had to sit idle while photos were taken.

A paper-based form outlining the information needed for individual Web pages was distributed in the class, and all students were requested to provide the data they felt comfortable in sharing. The students used Microsoft Word 6, which was available through the network at every workstation in the lab where the class was held. The completed documents were saved on floppy disks that I distributed and later collected.

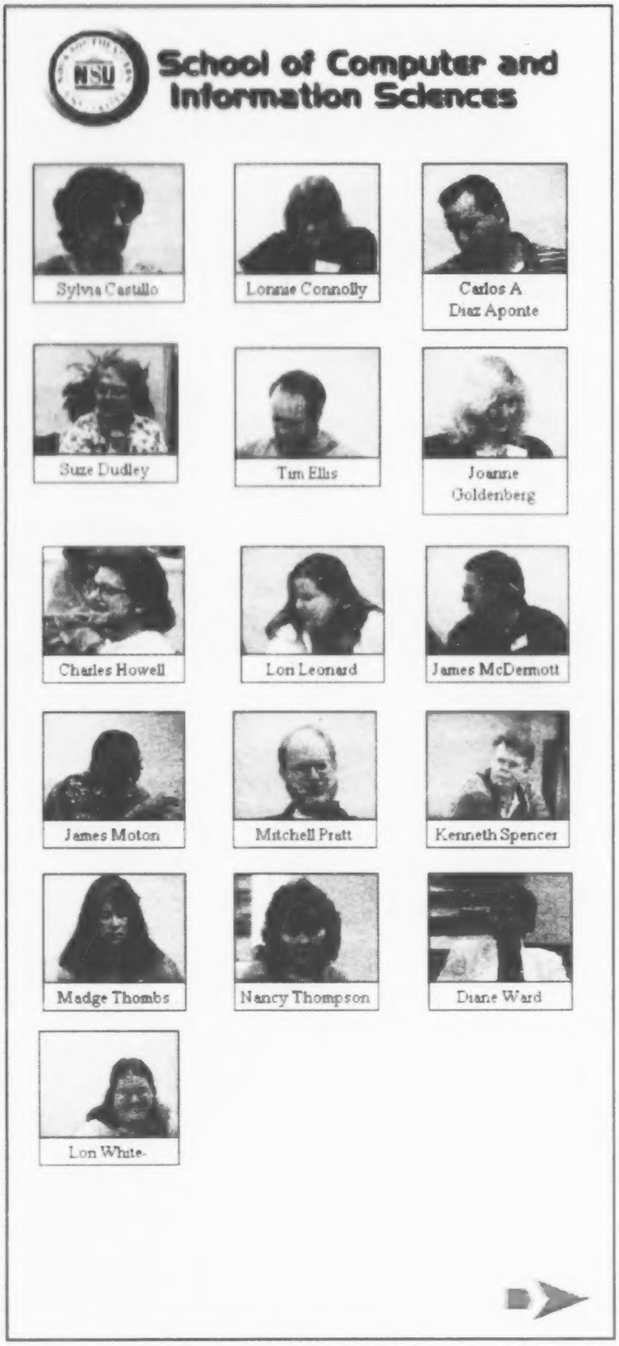
## Web Site Construction

This Web project required three steps. The computer system used for this development project had two 1Gb drives and two parallel ports, one for the ZIP drive and Snappy video-frame grabber system and the second for the printer. The CPU in this system was a 100 Mhz Pentium processor with 32MB of RAM.

The first step required capturing 16 individual student images using a VHS video camcorder. Image capturing required only 10 to 20 seconds of tape for each student picture. There were 16 students in the class and only a little more than 5 min of video tape was needed to record all of the images.

Individual video images were converted from the recorded video tape format to bitmapped images (bmp). This was done by replaying the video tape in a VHS playback system and sending the video signal to a Snappy video-frame grabber hardware and software system that was installed on the computer system. The bitmapped images were saved in a directory for later use.

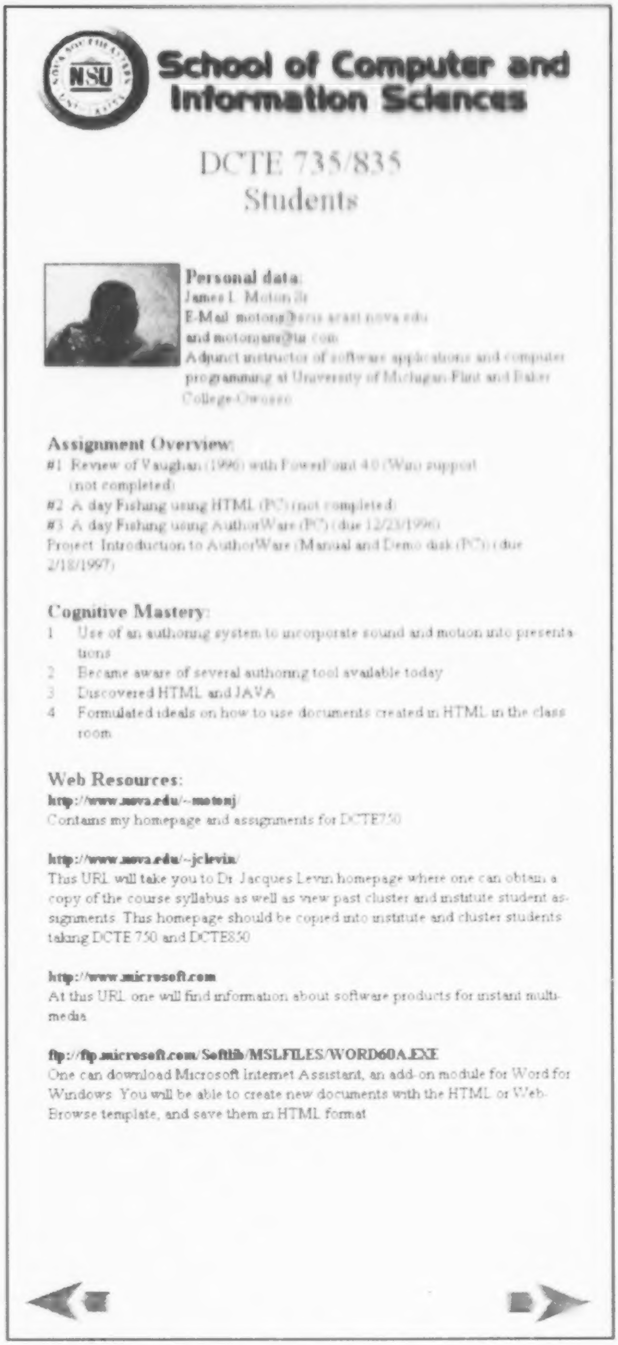
The final step was creating the Web site or collection of Web pages using Microsoft Publisher 97. Publisher 97 is a desktop publishing tool that has the



School of Computer and Information Sciences

Sylvia Castillo
Lonnie Connolly
Carlos A Diaz Aponte
Suze Dudley
Tim Ellis
Joanne Goldenberg
Charles Howell
Lori Leonard
James McDermott
James Moton
Mitchell Pratt
Kenneth Spencer
Madge Thombs
Nancy Thompson
Diane Ward
Lori White-

*Figure 2. "Main Menu" page showing thumbnail video captures of each student. Each thumbnail links the user to that student's Web page*



School of Computer and Information Sciences

DCTE 735/835
Students

**Personal data:**
James L. Moton Jr
E-Mail motonj@scis.acast.nova.edu
and motonjam@tir.com
Adjunct instructor of software applications and computer programming at University of Michigan-Flint and Baker College-Owosso

**Assignment Overview:**
#1 Review of Vaughan (1996) with PowerPoint 4.0 (Win) support (not completed)
#2 A day Fishing using HTML (PC) (not completed)
#3 A day Fishing using AuthorWare (PC) (due 12/23/1996)
Project: Introduction to AuthorWare (Manual and Demo disk (PC)) (due 2/18/1997)

**Cognitive Mastery:**
1 Use of an authoring system to incorporate sound and motion into presentations
2 Became aware of several authoring tool available today
3 Discovered HTML and JAVA
4 Formulated ideals on how to use documents created in HTML in the class room

**Web Resources:**

**http://www.nova.edu/~motonj/**
Contains my homepage and assignments for DCTE750

**http://www.nova.edu/~jclevin/**
This URL will take you to Dr. Jacques Levin homepage where one can obtain a copy of the course syllabus as well as view past cluster and institute student assignments. This homepage should be copied into institute and cluster students taking DCTE 750 and DCTE830

**http://www.microsoft.com**
At this URL one will find information about software products for instant multimedia

**ftp://ftp.microsoft.com/Softlib/MSLFILES/WORD60A.EXE**
One can download Microsoft Internet Assistant, an add-on module for Word for Windows. You will be able to create new documents with the HTML or Web-Browse template, and save them in HTML format

*Figure 3. Sample student page*

added capability of producing Web pages. Only three types of pages were needed, a splash or cover page, a "main menu page" of thumbnail images, and 16 similarly formatted individual student information pages. Standard Windows copy and pasting tasks made the creation of the student information pages a straightforward process.

## Web Site Information (Or How To Get There)

The URL for this Web site is:

http://devel1.scis.nova.edu/~gforn1/735demo/index.html

(Note: The character at the end of devel and gforn is a one.)

## Conclusion

This Web site was installed on our school's developmental computer system. This system is used by faculty and students for the design, development, and implementation of computer technology in education and computer information and science research projects.

Preliminary feedback from the students and from peers at SCIS is very positive. It will take a while before we can determine whether it will truly improve interstudent and large-group collaboration. As consulting editor of this journal, I encourage all readers to send to us comparable work you are doing. Also, write to HyperNexus with your impressions of this site.

## Product Information:

Microsoft Publisher 97 is available at your local Microsoft reseller. For more information, go to Microsoft's Web site at http://www.microsoft.com/.

Snappy can be purchased at your local computer software store or directly from Play Incorporated, 2890 Kilgore Road, Rancho Cordova, CA 95670; 888/888-PLAY; fax 916/631-0705; http://www.play.com/.

***George K. Fornshell** is a consulting editor for* HyperNexus *and an associate professor of computing technologies in education at the School of Computer and Information Sciences, Nova Southeastern University. You can reach him by e-mail at gforn@scis.nova.edu*

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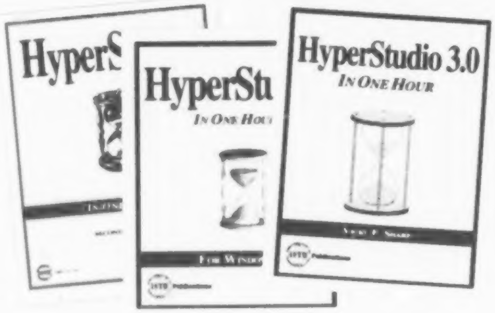

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With Vicki Sharp's *HyperStudio In One Hour*, you'll be cooking in comfort before you know it. Sample projects and step-by-step instructions written in conjunction with the latest developments by HyperStudio creator Roger Wagner take the sweat out of creating a four-card stack. Each card you create builds on the skills you've learned, making it easy to exploit the flexible, nonsequential nature of this exciting learning tool.

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*HyperStudio In One Hour, Second Edition (Macintosh)*
199 pages, ISBN 1-56848-073-5, ©ISTE, 2nd Edition, 1994

*HyperStudio In One Hour for Windows*
223 pages, ISBN 1-56484-097-2, ©ISTE, 1996

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# Intranet Use in the Learning Environment: Challenges and Prospects

*by Marlyn Kemper Littman*

An intranet takes existing Web technologies and utilizes them internally to maximize information distribution and exchange among specified individuals within a school or university community. This article explores planning strategies associated with intranet design and development. Examples of intranet deployment are presented. Intranet strengths and liabilities are reviewed. Approaches for building intranets to optimize collaboration are introduced. Guidelines facilitating effective intranet implementation in the learning environment are delineated.

Just what constitutes an intranet is the topic of considerable debate in the academic community. Intranets can be high-powered local area networks (LANs), Internet clones, mini-Internets, private Webs, in-house computer networks, and internal Internets (Bennett, 1996; Strom, 1996). Generally, "intranet" is an umbrella term that designates the implementation of World Wide Web technologies *within* an institutional network to support information sharing, seamless communications, and application access for a specified clientele. The Internet involves deployment of a communications system that fosters interconnectivity *between* institutional networks. Both intranets and the Internet utilize many of the same procedures, tools, and techniques including the TCP/IP (Transmission Control Protocol/Internet Protocol) suite for enabling data transmission and delivery.

Applications supported by intranets in the learning environment include student registration, invoice tracking, time-sheet submission, tuition billing, faculty and student projects, teletraining, telepublishing, full-text searching, teleinstruction, and document management. Discussion-group messages on salaries and grants, enrollment reports, student records, and database-query results on subjects ranging from attendance to alumni giving, are examples of resources that are readily shared among intranet users in an academic community.

## Intranet Fundamentals

Based on the communications standards of the Internet, intranets are internal networks that harness the power of the Web. Through support of TCP/IP based services such as HTML (HyperText Markup Language), HTTP (HyperText Transfer Protocol), and VRML (Virtual Reality Modeling Language), the Web is distinguished by its capacity to provide a consistent interface to information systems and resources. Traditionally, Web implementation by a school or university is associated with the establishment of an Internet presence. This presence is achieved through creating and posting a sequence of Web sites, home pages, and pointers that portray an institution's mission, goals, programs, and curricular offerings. The potential audience ranges from the general public, student applicants, and job seekers to external administrators conducting institutional research and educators planning new degree programs at peer and regional institutions.

An intranet, or internal Web, enables consolidation of diverse data stored on multiple computing platforms and display of these materials in a standardized view to a target clientele that ranges from small campus workgroups to geographically dispersed institutional users. From an educational perspective, an intranet is a private information exchange that promotes new ways of sharing knowledge and subject-matter expertise.

The basic building block for an institutional intranet is a Web server. As Carroll (1996) points out, the Web server, also referred to as the HTTP server, is the hub of intranet activity. Every Web server on an institutional intranet functions as a network node and contains related data. Typically, administrative and departmental Web servers in the learning environment are dedicated computers. The intranet infrastructure also includes a three-tier client–server architecture and physical network components such as connector cables and communications devices for enabling reliable information distribution.

A school or university intranet features the integration of TCP/IP protocols such as HTTP into the communications network paradigm. HTTP is used by Web browsers, such as NCSA Mosaic, Microsoft Internet Explorer, and Netscape Navigator, for providing point-and-click access to a wide array of information resources. Web browsers are available on the Internet as shareware and freeware. By supporting file types with filename extensions that include HTML, JPEG (Joint Photographics Experts Group format), TIFF (Tagged Image File Format), MPEG (Motion Picture Experts Group file interchange format), and GIF (CompuServe Graphics Image File format), Web browsers enable users to retrieve, view, and manipulate multiple data types.

Web browsers also support configuration options for matching filename extensions associated with MIME (Multipurpose Internet Mail Extensions) documents. MIME is an Internet standard for transmitting binary files containing images and graphics with plain text e-mail. As Eckel and Steen (1996) note, Acrobat Amber, RealAudio, WebFX, Shockwave, and QuickTime are among plug-ins that extend Web browser functionality as well.

CGI (Common Gateway Interface) scripts and programs enable HTTP to process Web browser requests, perform searches in institutional databases, and return formatted results. Perl, the Practical Extraction and Report Language, and C + + are two of the Web-aware programming languages capable of supporting CGI script generation.

Setting up and configuring an intranet requires initially selecting a computing platform, such as Windows 95, Windows NT, Macintosh, or Unix. As noted by Evans (1996), building an intranet also involves choosing Web servers, Web server software, browsers, document databases, and document conversion and authoring tools. HTTP host software products that are used in conjunction with Web servers for providing HTML pages to Web browsers include NCSA HTTPD, Microsoft Internet Information Server, and Netscape Commerce Server.

Specifications for operating, managing, and maintaining an intranet depend upon such factors as the number of users, the sophistication of the configuration, and the type of content portrayed. Intranet content ranges from straight text to graphics, video, audio, images, and compound documents. Both intranet and Internet Web pages are written in HTML format. HTML involves the incorporation of tags specifying document structure into plain text. HTML editing software and publishing tools such as Sausage Software's HotDog Pro and Mircrosoft's Internet Assistants facilitate conversion of existing documents and other legacy data to HTML.

Intranet toolkits such as Microsoft BackOffice and Netscape SuiteSpot provide platforms for intranet application development, customized file exchange, and collaboration. Generally, these toolkits feature flexible licensing schemes, Web browsers, integrated management services, and cross-platform and cross-database support. These toolkits also provide Telnet, WAIS (Wide Area Information Server), Gopher, FTP (file transfer protocol), and e-mail services in addition to HTML programs for creating and posting HTML documents.

The intranet/Internet combination for supporting reliable information exchange, transfer, and delivery, as well as platform-independent document distribution is powerful and robust. Building a flexible and scaleable intranet that supports reliable performance, links to multiple dissimilar systems including legacy LANs, and integration of current and next generation technologies involves careful planning and execution.

## Intranets in Action

Intranet deployment in the learning environment facilitates collaboration and enhances productivity among faculty, administrators, students, and staff in a specified user community. Schools and universities, both large and small, are incorporating Internet-based methods, tools, and services into their internal Webs as they embark on various intranet efforts. As the following examples demonstrate, intranet paradigms in the learning environment come in a variety of flavors.

Jean Coppola, (personal communication, September 18, 1996), manager of microcomputing systems and support for Pace University, noted that the intranet at Pace University, known as the IntraPace Network, features documents and data on accreditation, curricular programs, workshops, university activities, and special faculty and administrative projects. Microsoft Internet Explorer and Netscape Navigator are available for browsing. Coppola added: "The IntraPace network is designed to transform communications. This vehicle enhances learning by providing another medium through which the university community can be connected." Coppola indicated that only individuals holding Pace e-mail addresses can access the intranet using the university's Web site. A firewall is used to protect the intranet from intrusion.

The IntraPaceNetwork was designed by a team of network specialists. Intranets can also be launched by

Web enthusiasts. Hans Berends, head of the Physics Department and network manager at Saint Kentigren College in Pakuranga, New Zealand, is in charge of his institution's intranet and Web site. According to Berends, the intranet for this private school with an enrollment of 1,060 youngsters in Grades 6 through 12 runs on a spare PC. Software for developing the internal Web required a $45.00 investment. Berends (personal communications, September 11, 1996) related: "Although still in its infancy, our intranet features important notices, staff and student home pages, and public domain software for further local distribution. Access to our intranet through the school's Web site is limited to authorized school users with e-mail addresses."

Keith Segerson (personal communications, September 17, 1996), director of telecommunications and client support services at George Mason University, remarked that the intranet at his university enables students, faculty, and staff to access courseware, grades, academic transcripts, course schedules, personal data, and a vast storehouse of information. Segerson added that plans call for making the intranet accessible to authenticated users through the university's home page on the public Internet. Security mechanisms for safeguarding information integrity range from PINs (personal identification numbers) and passwords to firewalls.

At the University of Michigan, intranets are developed independently by schools, colleges, departments, and administrative units. Jeff Prevenost (personal communication, September 12, 1996), network and support manager for the University of Michigan's School of Business Administration, indicated that his school's intranet is under development as a branch of the public Internet. Authorized users with current passwords will have the capability to access intranet information. Wanda Monroe (personal communication, September 13, 1996), internal communications specialist with the University of Michigan's Information Technology Division, commented that her division is in the planning phase of intranet deployment as well. Monroe stated: "Access will be restricted to staff. Information resources such as software tools, project status reports, and departmental news will be available....The intranet is a wonderful resource for communications as long as it is effectively designed and maintained."

The Wilton High School intranet includes information on classes, clubs, and extracurricular activities and provides students in the high school community with the opportunity to gain basic skills in browsing the Web with Netscape Navigator. The Darden Graduate School of Business at the University of Virginia makes curricular information and class lists available on its intranet. The intranet developed by the College of Education and Applied Professional Studies (CEAPS) at the University of Tennessee at Chattanooga includes course syllabi, lesson plans, and campus news.

The intranet created by California State Polytechnic University at Pomona (Cal Poly Pomona) features bulletin boards, e-mail, registration forms, job postings, a university master calendar, grades, freeware, and shareware. A security policy developed by Cal Poly Pomona safeguards intranet resources. Only authenticated users can access infrastructure services.

The intranet designed by Pennsylvania's Jefferson County-DuBois Area Vocational-Technical School (Jeff Tech) supports software distribution to classrooms and labs. Security procedures are handled by data processing students and their instructor. Software can be installed on the intranet only after legal ownership is verified and disks are scanned for viruses. Students accessing the Internet from the Jeff Tech Intranet sign computer usage agreements. Cybersitter, an Internet filtering program, blocks access to global Web sites deemed inappropriate.

Authentication mechanisms such as usernames and passwords are deployed by the National University of Singapore, Loyola University of Chicago, and the Department of Sociology in the School of Liberal Arts at South Western Texas University restricts intranet access from the Internet to specified faculty, administrators, students, and staff. Harnessing the power of the Web to facilitate information sharing among various departments within a school or university does not necessarily involve using Web pages on the Internet as points of internal access. Paul Flanagan (personal communication, September 14, 1996), professor at National Defense University (NDU), noted that the NDU Intranet is located on an in-house Web server with access restricted locally to authenticated users.

Intranets are typically limited to authorized personnel within a school or university. Physically, intranets can span the globe as long as access is confined to a defined community of interest. This access is not always controlled by security measures. The intranet developed by the Boston University School of Public Health is an unrestricted Internet site. In other words, the School of Public Health's intranet is fully accessible from the public Internet because the intent is to accommodate the information needs of the off-campus community. This intranet features academic services, course materials, schedules, and pointers to external sites ranging from the *Federal Register*, *Boston Globe*, and *New York Times* to the Centers for Disease Control and Prevention.

Intranets containing text-based documents such as annual reports, purchasing forms, job postings, phone directories, and information on topics that include student activities, affirmative action, insurance, scholarships, clinical psychological services, financial aid, and short-term loans are easily updated with time-sensitive information. Because this decision-making data is readily distributed across multiple sites, publication and duplication costs are eliminated. Miami Dade Community College uses an intranet, for instance, to disseminate campus procedures to faculty and staff. The libraries at the University of California at San Diego feature circulation policies and material relating to human resources and administrative services on their internal Web pages.

Typically, intranets are created by functional units such as academic departments, libraries, or schools that are responsible for maintaining information content on internal Web pages. Another interesting phenomenon is the development of community intranets that serve as points of access to school networks.

The Stillwater, Oklahoma intranet contains information about local businesses, the chamber of commerce, and churches and facilitates connectivity to the Stillwater secondary school network. The school site features material on library holdings; track and field events; alumni activities; and links to *CNN*, *USA Today*, and Internet search engines.

The Washington County, Pennsylvania intranet includes information on restaurants, merchants, religious organizations, and schools. Its mission is to serve as a virtual town hall for social and business activities and community events.

## Benefits and Limitations

Intranets permit institutional collaboration and serve as focal points for a broad range of applications in the learning environment. They are distinguished by their internal use of Web-based technologies and flexibility in operating in heterogeneous computing environments. With intranets, information formerly locked up in legacy systems can be shared throughout the school or university. Intranets are well suited for organizing information from diverse sources into an easily accessible format and work in any network environment supporting TCP/IP.

Intranets enable local and remote institutional users to readily find, retrieve, share, and update information. These internal Webs facilitate online publishing of brochures, catalogs, policy manuals, newsletters, and reports. They support interactive database queries, registration and request forms, recruitment, teletutorials, telesurveys, and group communication and collaboration. The utilization of an intuitive graphical user interface promotes ease of use and facilitates document management and software installation and deployment.

Building and designing an intranet involves a considerable amount of staff time. Intranet applications created with freeware, shareware, and new versions of software products may have little or no documentation, thus contributing to administrative complexities.

Intranets are supported by a variety of networking paradigms including LANs, MANs (metropolitan area networks), private WANs (wide area networks), and the Internet. These internal Webs require added bandwidth and network services for their operation, thus presenting additional network management and performance requirements.

One of the major appeals of intranet applications is their universal interoperability. However, the recent proliferation of Web products, languages, and proprietary extensions contributes to confusion in the design process. According to Raynovich (1996), with companies such as Microsoft and Netscape developing applications that lock users into proprietary architectures and vendor-specific platforms, the openness that characterizes the intranet is at risk.

Intranet deployment in the learning environment is a new phenomenon. Benefits and liabilities of Web technologies for intranet use in school and university settings are not yet fully documented or understood.

## Planning Strategies

Intranets enable users to access information on institutional Web servers with the same browsei , they use on the Internet. Distinguished by their support of multiple computing platforms and ability to link information sources and disparate databases across an institution, intranets allow instructors to accomplish a variety of tasks directly from their desktop computers such as posting student home pages, checking class lists, searching institutional databases, ordering supplies, joining in group discussions, accessing student files and records from the registrar, and reviewing censorship policies.

Various issues must be considered when you are determining the feasibility of intranet implementation in the learning environment. Typically, the planning process begins with an analysis of institutional goals and objectives for intranet use, an assessment of the demographics of the user community, and a clarification of the scope of the project. Additional steps include documenting requirements and constraints; identifying start-up, recurring, and anticipated costs; and delineating implementation strategies and a timeline for deployment. Guidelines for installation and administration must be specified. An intranet may be inexpensive to put together and implement but draining in terms of resources needed for effective functioning on a daily basis. The questions that follow provide a useful starting point in creating an intranet for the learning environment:

- What is the purpose of the school or university intranet?
- What Web and non-Web components will make up the intranet?
- Will the intranet be implemented throughout the school or university or limited in scope to specified departments and administrative units?
- What groups will use the intranet?
- What types of applications will they need?
- How can intranet implementation benefit the user community?
- What are potential constraints and limitations?
- How much staff time will be committed to intranet development and implementation?
- What kinds of continued training are required to make the intranet work?
- What is the available budget?
- What actions should be taken now?

Building appropriate solutions for intranet use in the school and university setting also involves identifying appropriate hardware and software, assembling and integrating various network components, and determining initial and ongoing costs. The following questions are helpful in this process:

- What are software and hardware requirements for supporting intranet applications?
- What criteria will be used when selecting Web technologies for intranet use?
- What steps will ensure the integration of legacy systems into the intranet?
- What tools will be used for creating HTML documents?
- What kinds of plug-ins will be put into place?
- Will animation tools for producing video special effects be available?
- What types of helper applications will facilitate the use of multimedia file formats?
- What search tools (e.g., Alta Vista, Excite, and Lycos) will be deployed?
- Is TCP/IP available across the institution?
- How will increased traffic associated with intranet implementation affect network response time?
- Will additional bandwidth and network services be necessary?
- How will remote users access the intranet?
- What are estimated costs for setting up and maintaining the intranet?
- Is intranet deployment financially feasible?

A key issue in the use of intranets connected to or linked by a network such as the Internet is security. Approaches for protecting intranet Web pages, discussion groups, databases, directories, and applications from malicious intruders include the use of a variety of security mechanisms including passwords, encryption techniques, and firewalls.

Security guidelines, policies, and procedures must be developed to maintain confidentiality, prevent unauthorized access to information, and ensure that only verified users access intranet resources and services (Littman, 1996). An assessment of intranet security involves answering questions such as the following:

- Which information on the intranet is critical?
- What kinds of intrusion if any are tolerable?
- Will the intranet support access to and from a communications network such as the Internet?
- What kinds of security mechanisms must be put into place to safeguard information integrity?
- What must be done to protect intellectual property rights?

Intranet deployment involves defining staff and administrative responsibilities for development, operations, and technical support. Periodic assessments dealing with intranet impact on collaborative efforts, instruction, and research are important as well. Questions such as the following are useful in establishing procedures for building and operating a successful intranet:

- Who will be responsible for intranet creation and maintenance?
- Who will monitor intranet Web pages and ensure that material is up-to-date and intact?
- Who will take part in a periodic intranet review process; provide consultation on development issues; and conduct formal and informal training for faculty, students, administrators, and staff?
- Who will publish on the intranet?
- How will copyright clearance for intranet materials be managed?
- What software licenses are necessary?
- How will user feedback be obtained to assess intranet Web page design, content, and usability?
- How will the currency and validity of Internet links to and from the intranet be tracked?
- How will intranet use enable instructors to enhance course content and expand the scope of material covered in class?
- In what ways will the intranet facilitate record keeping and administrative work?
- What strategies will be used for providing access to information on legacy systems?
- What are expected outcomes of intranet implementation on teaching, learning, and research?
- How will the intranet foster teamwork and higher performance levels?

If the decision is made to go forward with development, the intranet can be created internally with intranet software and toolkits available in the marketplace. Another option is outsourcing or contracting with an intranet service provider to plan, design, and implement an intranet solution. Deployment of a pilot intranet project is recommended prior to full-scale implementation.

## Conclusion

Intranets accommodate basic and sophisticated applications and promote the creation of a dynamic learning environment. Successful intranet implementation requires an understanding of current technological trends, an analysis of technical requirements, a delineation of institutional goals and objectives, clearly written policies and procedures, management commitment and support, and ongoing staff education and training. Although Web addresses are subject to change, the Internet remains a rich source of information for monitoring intranet advancements.

My research to date demonstrates that intranets can enhance and enrich activities in the learning environment. An understanding of intranet technical fundamentals is critical in order to address effectively challenges associated with the design and implementation of intranets in the school and university setting.

## Resources

Acrobat Reader 3.0 is available for free download at http://www.adobe.com/prodindex/acrobat/readstep.html/.

Alta Vista Search can be accessed at http://altavista.digital.com/.page

Boston University's School of Public Health Intranet Resources is at http://med-sph.bu.edu/.

California State Polytechic University-Pomona's Web site is at http://www.csupomona.edu/welcome.html/.

The Darden Graduate School of Business Intranet is located at http://www.darden.virginia.edu/cgi-shl/dbml.exe?template = /intranet/login.dbm/.

Excite can be accessed at http://www.excite.com/.

Jefferson County-DuBois Area Vocational-Technical School is at http://www.jefftech.tec.pa.us/.

Lycos can be accessed at http://www.lycos.com/.

Miami-Dade Community College's home page is at http://www.mdcc.edu/.

Microsoft product information is available at http://www.microsoft.com/.

NCSA product information is available at http://www.ncsa.uiuc.edu/Indices/Software/.

Netscape product information can be found at http://home.netscape.com/.

Pace University's home page is located at http://www.pace.edu/newhome.html/.

QuickTime information is available at http://quicktime.apple.com/.

RealAudio information can be found at http://www.realaudio.com/.

Saint Kentigen College's home page is located at http://www.skc.school.nzl.

Sausage Software product information can be found at http://www.sausage.com/.

Shockwave can be downloaded from http://www.macromedia.com/shockwave/.

The Stillwater, Oklahoma, Intranet can be found at http://www.stilwater.ok.us/.

University of California-San Diego's Library intranet is available at http://orpheus.ucsd.edu/libstaff/internal.html/.

The University of Tennessee-Chattanooga College of Education and Applied Professional Studies Web site is located at http://www.utc.edu/~ceaps/.

The Washington, Pennsylvania, Community Intranet can be accessed at http://washington.penna.com/.

WebFX can be downladed from http://www.hetzl.com/webfx.htm/.

The Wilton High School intranet is located at http://www-unix.umass.edu/~dquist/intranet.html/.

## References

Bennett, G. (1996). *Introducing intranets*. Indianapolis, IN: Que Corporation.

Carroll, M. L. (1996). *Cyberstrategies: How to build an Internet-based information system*. NY: Van Nostrand Reinhold.

Eckel, G., & Steen, W. (1996). *Intranet working*. Indianapolis, IN: New Riders.

Evans, T. (1996). *Building an intranet*. Indianapolis, IN: Sams.net.

Littman, M. K. (1996, Winter). Guidelines for network security in the learning environment. *Journal of Instruction Delivery Systems, 10*, 35–40.

Raynovich, R. S. (1996, September 30). Closed apps limit intranets. *LAN Times, 13*,1, 18.

Strom, D. (1996, June 10). Finding the right intranet technologies to buy. [Online] Available http://www.strom.com/pubwork/intra2.html/.

***Marlyn Kemper Littman** is a professor at the School of Computer and Information Sciences, Nova Southeastern University, 3100 SW 9th Avenue, Fort Lauderdale, FL 33315; marlyn@scis.nova.edu.*

ISTE PUBLICATIONS

HYPERMEDIA HELP FROM ISTE!

Two, Two, Two Worlds in One

INTRODUCTION TO
MICROWORLDS
A LOGO-BASED HYPERMEDIA ENVIRONMENT
SHARON YODER
DAVID MOURSUND

**Introduction to MicroWorlds 2.0—**
**A Logo-Based Hypermedia Environment**

MicroWorlds is a powerful hypermedia application that offers many of the appealing features seen in Kid Pix, HyperCard, and LogoWriter in a single program. This Version 2.0 edition is newly revised and includes all new screen shots. Learn to use MicroWorlds objects to control turtles and add text. Learn to integrate sound, music, audio CDs, Laserdiscs, and QuickTime movies into your computer-generated projects. Each chapter discusses problem solving in the MicroWorlds environment and includes tips on techniques, activities, and self-assessment. Appendices contain a list of all the Logo primitives available in MicroWorlds.

Sharon Yoder & David Moursund
*Introduction to MicroWorlds 2.0—A Logo-Based Hypermedia Environment*
211 pages, ISBN 1-56484-106-5
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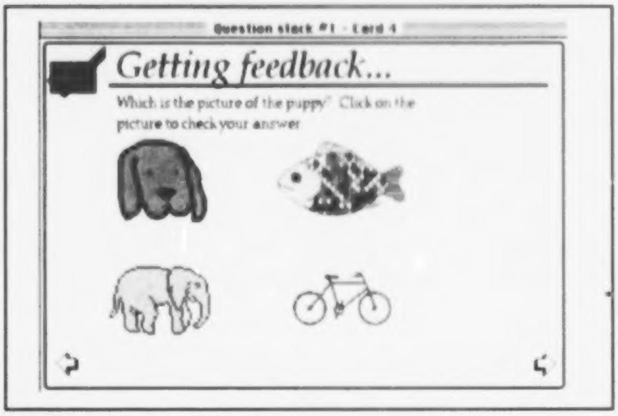
# Asking Questions and Giving Simple Feedback in Multimedia HyperStudio Stacks

*Ellen Storey Vasu*

One of the courses in our instructional technology master's degree curriculum leading to certification as a K–12 instructional technology specialist in computers, involves designing and creating a multimedia project. The teachers enrolled in the course use the PowerMac version of HyperStudio 3.0 to create their multimedia stacks and usually try to create stacks that will be of use to them in their classrooms or in training other teachers. As their stacks become more complex, they often want to include some interactive questions in their stacks that provide simple feedback to people using their stacks. There are a number of different ways to do this, ranging from the use of a HyperStudio New Button Action (NBA) to the more complex use of HyperLogo scripting. This article describes how to ask questions and provide simple feedback within a HyperStudio 3.0 stack through the use of the HideShow NBA. Two types of questions will be discussed: dichotomous-choice questions and multiple-choice questions.

## Dichotomous-Choice Questions

A dichotomous-choice question is one with only two possible choices, such as correct or incorrect, true or false, or yes or no (Price, 1991). An example of a simple dichotomous-choice question that could be used with children is displayed in Figure 1.



Question stack #1 - Card 4

Getting feedback...

Which is the picture of the puppy? Click on the picture to check your answer

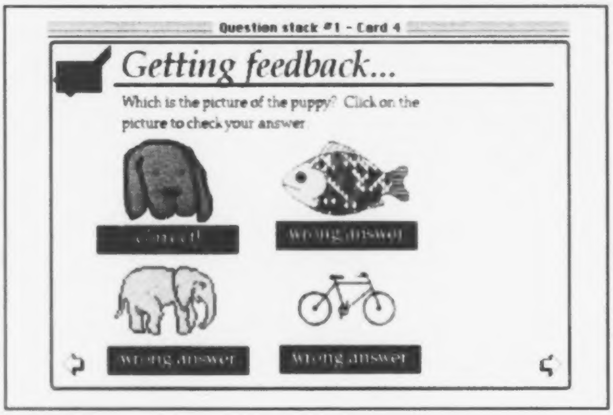
Figure 1.

The child is asked to click on the picture of the puppy. if the child clicks on the correct picture a pop-up text object will appear with the word "correct!" (see Figure 2). If the child clicks on the fish, elephant, or bicycle a pop-up text object will appear with the words "wrong answer." Sound can also be used to provide feedback, but only the pop-up text object will be discussed here. Please note that HyperStudio also refers to a "text object" as a "text field" or a "text item." The names text object and text field will be used interchangeably here. Text item is used when writing HyperLogo script.

### *Components of a Dichotomous-Choice Question in HyperStudio 3.0*

These directions assume you already have some experience using HyperStudio 3.0 to get clip art, create an invisible button, and create, reshape, and move a text object.

The puppy picture in Figure 2 has below it a text object called *puppy*. The fish has below it a text object called *fish*. The elephant and bicycle also have text objects below them with matching names. Over each picture there is an invisible button with the same name as the clip art picture—so there are *puppy*, *fish*, *elephant* and *bicycle* buttons. Figure 3 shows the puppy picture, with the button and text field. The text object style is white text on a black background.



Question stack #1 - Card 4

Getting feedback...

Which is the picture of the puppy? Click on the picture to check your answer

Figure 2.

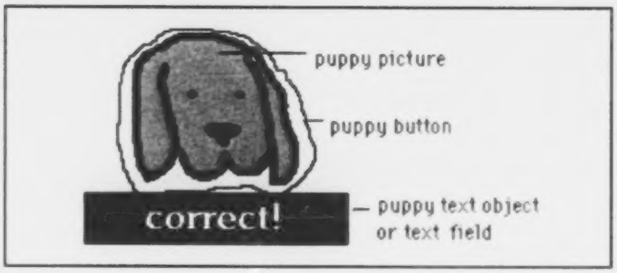

puppy picture
puppy button
correct!
puppy text object
or text field

Figure 3.

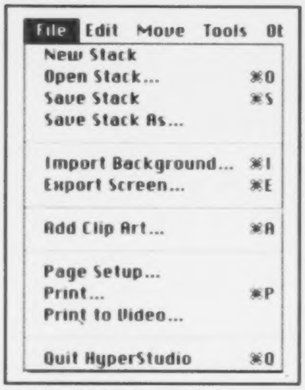

File Edit Move Tools Ot
New Stack
Open Stack... ⌘O
Save Stack ⌘S
Save Stack As...
Import Background... ⌘I
Export Screen... ⌘E
Add Clip Art... ⌘A
Page Setup...
Print... ⌘P
Print to Video...
Quit HyperStudio ⌘Q

Figure 4.

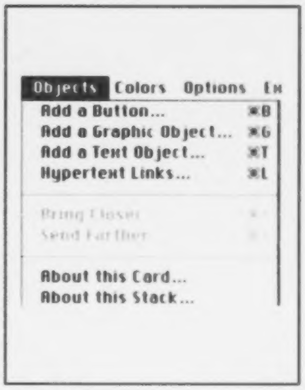

Objects Colors Options Ex
Add a Button... ⌘B
Add a Graphic Object... ⌘G
Add a Text Object... ⌘T
Hypertext Links... ⌘L
Bring Closer
Send Farther
About this Card...
About this Stack...

Figure 5.

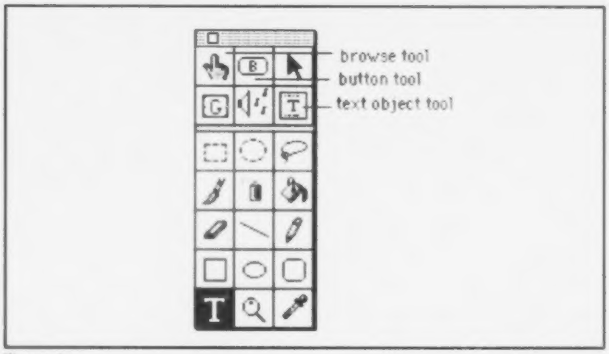

browse tool
button tool
text object tool

Figure 6.

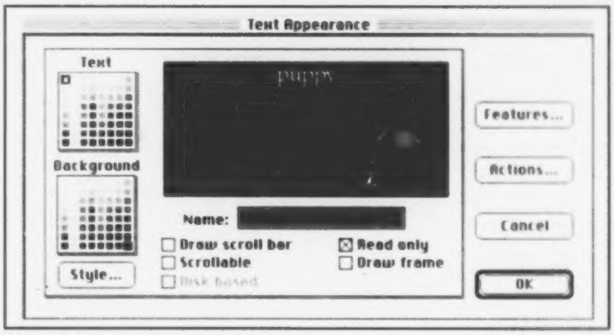

Text Appearance
Text
Background
puppy
Name:
☐ Draw scroll bar
☐ Scrollable
☐ Disk based
☒ Read only
☐ Draw frame
Style...
Features...
Actions...
Cancel
OK

Figure 7.

Clicking on the puppy button causes an NBA to occur that uses the HideShow NBA to alternately hide or show the *puppy* text object. Click once and it shows. Click again and it flips, or hides. Inside the *puppy* text object is the word "correct!" Inside the text objects for the other pictures are the words "wrong answer." Let's look at creating a dichotomous-choice item using a *puppy* picture, *puppy* button, and the *puppy* text object step-by-step to see how this works.

***Creating a Dichotomous-Choice Item***

Start a new stack or a new card using HyperStudio 3.0. Add a clip art picture of a puppy to your card by choosing Add Clip Art... from the File menu (see Figure 4). You can, of course, follow these directions and add any picture to your card that your choose.

From the Objects menu, choose Add a Text Object... to add a text object to the card (see Figure 5).

The HyperStudio 3.0 tools palette is displayed in Figure 6. Using the text object tool, reshape the text object into a small rectangle and place it under the puppy picture as shown in Figure 2.

Using the text object tool, double-click on the puppy text object. The Text Appearance dialog box appears (see Figure 7). Type the name of the text object, into the text box. Choose the style, color, and background color that you want for the text. I used white 18pt Palatino text on a black background. In the Text Appearance box click on Read only so that no one can change your text.

From the Objects menu, choose Add a Button.... Click away from the button on the card. The Button Appearance box appears (see Figure 8). Place an invisible button on top of the picture of the puppy by choosing the lasso tool and following the screen prompts. Name

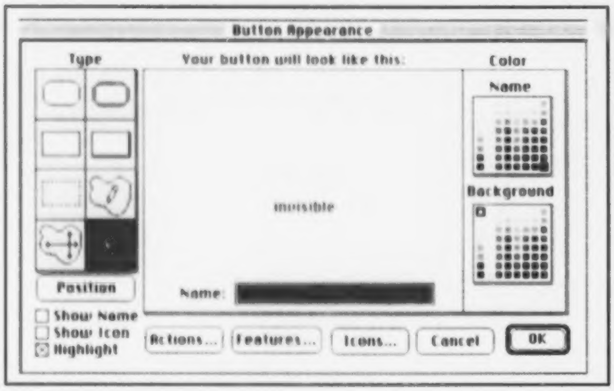

Button Appearance
Type
Your button will look like this:
Color
Name
Background
invisible
Position
Name:
☐ Show Name
☐ Show Icon
☒ Highlight
Actions...
Features...
Icons...
Cancel
OK

Figure 8.

BEST COPY AVAILABLE

the button "puppy." In the Button Appearance box for the puppy button, click on Actions.... If the Button Appearance box closes, double-click on the puppy button with the button tool and it will reopen.

The button Actions box appears (see Figure 9). Click on New Button Actions.... The New Button Actions box appears (see Figure 10). Click on HideShow and Use this NBA.... The HideShow box appears (see Figure 11). Type in the name of the text object you want to HideShow, puppy, then click on text field and flip.

Click OK, OK, and Done, at each of the windows to get back to the card level. Switch to the browse tool and test your button. When you click once on the picture of the puppy, the word "correct!" appears. When you click on it again, it disappears, because the text field is flipping from hide to show.

### *Attaching the HideShow Action to the Text Object*

If you prefer, you can make the text object hide when you click on it, rather than having it hide when you click on the puppy picture. Using the text object tool, double-click the puppy text object. In the Text Appearance box, click on Actions.... In the Actions box click on New Button Actions.... In the New Button Actions box, click on HideShow and Use this NBA.... In the HideShow box, type in the name of the text object you want to hide, puppy. Also click on text field and hide it. This means that when you click on the open puppy text field, it will hide (close and disappear from view).

## Multiple-Choice Questions

A multiple-choice question consists of a stem and a list of several alternative that includes the correct answer and several incorrect alternatives (Price, 1991). In the example shown in Figure 12, the stem consists of the following question: "Which of the following snacks most likely contains the least fat?" The alternatives are:

1. Yogurt & apple.
2. Pie & coffee.
3. Diet soft drink & ice cream.
4. Hard roll & butter.

When a child clicks on one of the alternatives (hypertext links) a feedback text object appears. Figure 12 shows what appears when you click on the hypertext link *yogurt & apple.*

### *Components of a Multiple-Choice Question in HyperStudio 3.0*

The components of a multiple-choice question in HyperStudio are very much the same as a dichotomous-choice item. Figure 13 shows one text object called question containing the stem and all the alternatives. This example also shows the four other text objects named 1, 2, 3, 4, each containing the appropriate response for the item selected. In addition, Figure 13 shows the four hypertext links: yogurt & apple, pie & coffee, diet soft drink & ice cream, and hard roll & butter.

The hypertext links are usually displayed in color (red) on the card so that the user knows they are links, and that when they click them some action will occur. Clicking on these links will cause the associated text object to show. Clicking on *yogurt & apple* will cause text object 1 to appear containing the words " Yes! That's correct!" Clicking on text object 1 itself, will cause it to hide. Text objects 1, 2, 3, and 4 are displayed in Figure 13 along with their contents.

### *Creating a Multiple-Choice Item*

Creating a multiple-choice item is very similar to creating a dichotomous-choice item in HyperStudio

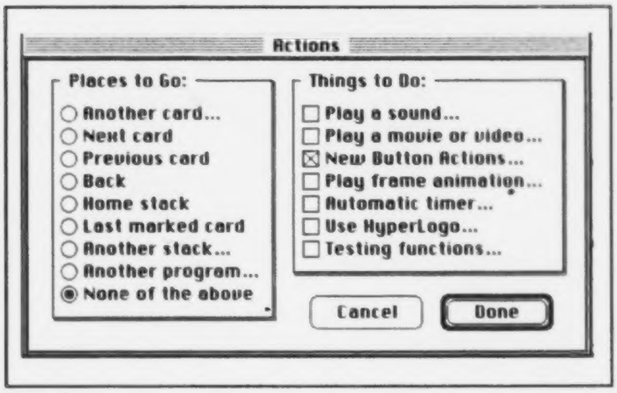
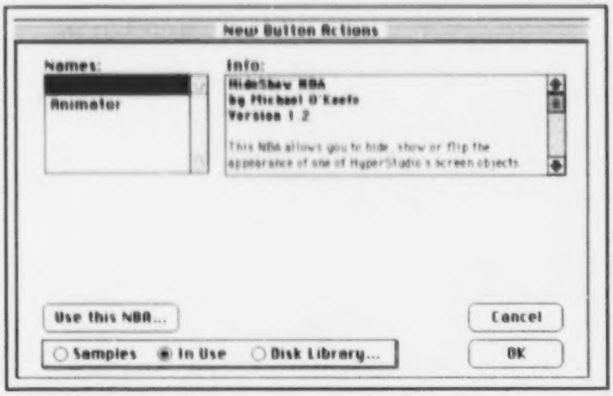

Actions
Places to Go:
○ Another card...
○ Next card
○ Previous card
○ Back
○ Home stack
○ Last marked card
○ Another stack...
○ Another program...
● None of the above
Things to Do:
☐ Play a sound...
☐ Play a movie or video...
☒ New Button Actions...
☐ Play frame animation...
☐ Automatic timer...
☐ Use HyperLogo...
☐ Testing functions...
Cancel
Done

*Figure 9.*

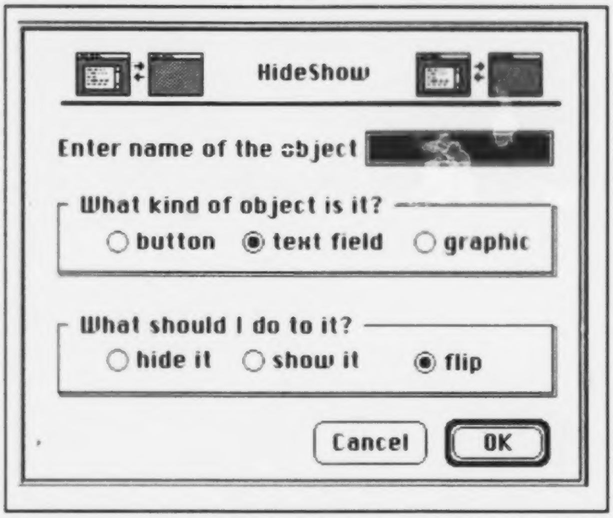

New Button Actions
Names:
Animator
Info:
Use this NBA...
Cancel
○ Samples
● In Use
○ Disk Library...
OK

HideShow NBA
by Michael O'Keefe
Version 1.2

This NBA allows you to hide, show or flip the appearance of one of HyperStudio's screen objects

*Figure 10.*

3.0. The only part that differs is that with the multiple-choice item we will use hypertext links. Let's review the procedure, assuming that you have already learned how to make the dichotomous-choice item described previously.

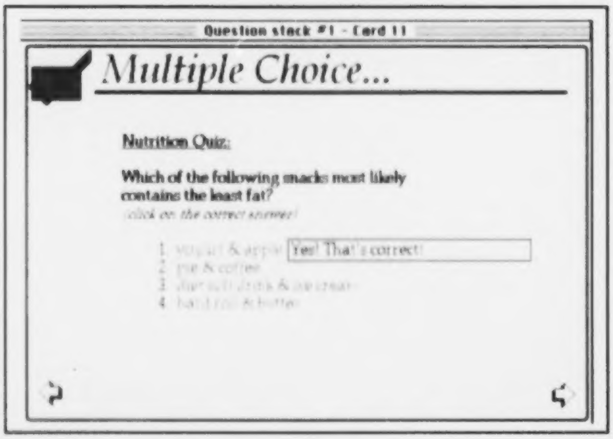


Enter name of the object

What kind of object is it?
○ button ● text field ○ graphic

What should I do to it?
○ hide it ○ show it ● flip

*Figure 11.*



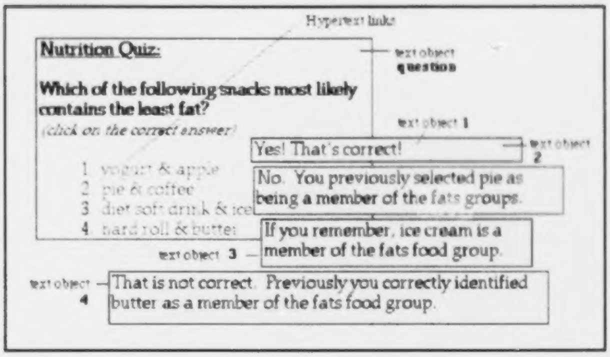
Multiple Choice...

Nutrition Quiz:

Which of the following snacks most likely contains the least fat?
(click on the correct answer)

1. yogurt & apple Yes! That's correct!
2. pie & coffee
3. diet soft drink & ice cream
4. hard roll & butter

*Figure 12.*



Nutrition Quiz:

Which of the following snacks most likely contains the least fat?
(click on the correct answer)

1. yogurt & apple
2. pie & coffee
3. diet soft drink & ice
4. hard roll & butter

Yes! That's correct!

No. You previously selected pie as being a member of the fats groups.

If you remember, ice cream is a member of the fats food group.

That is not correct. Previously you correctly identified butter as a member of the fats food group.

*Figure 13.*

Create a new card. Using the text object tool, create a text object and name it question. Using the browse tool enter the text for your stem as well as all the text for each of your alternatives. Let's assume that your first alternative is *1. yogurt & apple*, and that this is the correct alternative. Using your text object tool, create a new text object. Name it 1 and, using the browse tool, type in the words "Yes! That's correct!" At this point you should have two text objects on the card. One text object is named question and contains the stem and all the alternatives. The other text object is named 1 with the feedback to alternative 1 (see Figure 13).

### *Creating a Hypertext Link*

Using the browse tool, click and drag across the text *yogurt & apple* to highlight it. From the colors menu select the color red so that the words *yogurt & apple* appear in red. With the words still highlighted, choose Hypertext Links... from the Objects menu. Click on Add link (see Figure 14).

After you click Add link, the words *yogurt & apple* move into the box to the left of Add link. Next click on Action.... From this point on, the procedure is the same as it was for the dichotomous-choice item. Remember, when you click on *yogurt &* apple you want the text object named 1 to appear with it's contents "Yes! That's correct!"

In the Actions box, click on New Button Action.... In the New Button Actions box, click on HideShow and then Use this NBA.... In the HideShow box, type in the name of the object you want to show, 1, click on text

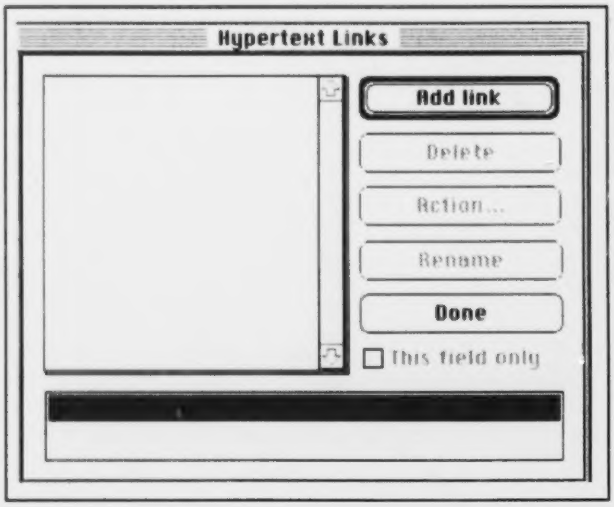


*Figure 14.*

object, and then click on show it. Then click on OK, OK, and Done.

It is very important that you type the name of the text object in the HideShow box the same as you typed it in the Text Appearance box. (Compare the name in Figure 7 with the name in Figure 11.) These must match exactly in order for the NBA to work. In both boxes I named the text object 1 If I type 1. in one box and 1 in the other box they would not match, since one would have a period and the other would not. You could name it one if you prefer. Because HyperStudio is sensitive to case, I recommend that you use lower case only.

## Conclusions

Using multimedia software for project presentations and stack development is exciting and challenging. Adding color, sound, QuickTime videos, and animation is becoming easier with each new generation of software. Including questions with simple feedback adds interactivity to the stacks that teachers and children develop and is no longer a difficult task with the use of HyperStudio's NBAs.

## Reference

Price, R. (1991). *Computer-aided instruction: A guide for authors.* Pacific Grove, CA: Brooks/Cole Publishing Company.

***Ellen Storey Vasu*** *is an associate professor and the coordinator of the graduate program in Instructional Technology—Computers, Department of Curriculum and Instruction, Box 7801, North Carolina State University, Raleigh, NC 27695-7801; 919/515-1779; esvasu@unity.ncsu.edu.*

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# HyperStudio Express: A Book Review

*Kevin Andreyo*

**Authors:** David W. Cochran and Robert A. Staats, Jr.
**Copyright:** 1997
**Publisher and Address:** ITP, An International Thomson Publishing Company, 7625 Empire Drive, Florence, KY 41042
**Price:** $16.00 ($24.95 with Resources/Solutions disk)
**ISBN No.:** 0-538-65817-7
**Target audience:** K–12
**Subject:** An introduction to HyperStudio 3.0 for the Macintosh

HyperStudio is an excellent piece of software to introduce students in all grades to multimedia authoring. Before students and educators can begin creating fantastic projects, they must learn the technical details of using the software. I am always looking for good resources to share with the educators in the 18 school districts in my county.

I, like many people, refer to a software's manual only as a last resort. Not unlike many of you, I find that most manuals are boring and difficult to read. Unfortunately, the current version of the HyperStudio is not completely intuitive and has some shortcomings, although it is better than most products on the market. For example, it does not include a built-in online help system, and the reference manual is bit awkward. Most manuals share the same shortcomings; this is why there is a market for supplemental references for most software.

Cochran and Staats, the codirectors and founders of the HyperStudio Network, the international information source for HyperStudio, are the authors of *HyperStudio Express*.

This book is a delightful addition to the HyperStudio reference manual. *HyperStudio Express* will get you up and running with HyperStudio with a maximum amount of enthusiasm and a minimum amount of frustration.

*HyperStudio Express* is an accurate introduction to creating hypermedia and multimedia. It is not for the advanced user; it does not provide all the advanced technical details of the program. The course of study and comprehensive tutorial address the needs of the new user. The 18 lessons give clear and simple step-by-step instructions for creating HyperStudio stacks. These lessons cover all of the basics of HyperStudio multimedia authoring, including working with graphics, backgrounds, text, buttons, sound, animation, and movies. The lessons are incremental and developmental. Each lesson includes an introduction, objectives, vocabulary, step-by-step instructions, lesson assessment, and activities for additional practice and tips for effective HyperStudio stack design.

Lesson 18, "Putting It All Together," ties the technical process with the design process. This lesson includes choosing a topic, doing research, organizing information, doing a draft, designing cards, connecting cards, and testing and evaluating the stack.

The *HyperStudio Express* appendices ("A HyperStudio Skills Mastery Checklist," "Planning a Stack Using Concept Mapping," "How to Evaluate a Stack," and "Project Ideas") all contain information not regularly included in technical manuals. I especially enjoyed the section "Planning a Stack Using Concept Mapping." This section provides the framework for planning a fun and easy-to-use stack.

Included with the book are a resource disk, which provides clip art and sounds to add to your stacks, and a solutions disk, which contains samples of completed stacks. These disks provide a nice complement to the text.

## Recommendation

Use this book for independent study or in a class. The authors thoughtfully planned the lessons to be completed in a 40-min period. This provides ample time for an introduction of the lesson, practice by students, and conclusion "before the bell rings."

I believe that when "students," be they teachers or students, complete the course, they will feel confident using HyperStudio. After mastering the multimedia authoring process, they can begin to creatively use this wonderful means of communication. Kudos to Cochran and Staats for writing a fine text.

*__Kevin Andreyo__ is the educational technology services project manager for the Berks County Intermediate Unit, 1111 Commons Boulevard, PO Box 16050, Reading, PA 19612-6050.*

# Exploring the Past

### *by Donald H. Sanders and Eben Gay*

> *Today, class, we will study the civilization of Greece, not by watching a movie or by listening to me tell you about it, but by visiting an ancient Greek farmhouse and learning what life was like more than 2000 years ago. Each of you may wander freely around the house, explore the rooms, and see the farmer at work. If you have any questions, just access your multimedia guide.*

What a wonderful learning experience it would be if pupils were able to do just that! But, they can. The technologies, including virtual reality and the information superhighway, are already accessible in many classrooms across the country. We believe, however, that for virtual reality (VR) to have a positive impact on public education, the content should be based on actualities, like the lifestyle on an ancient Greek farmstead or the religious practices of an Egyptian priest, not on fantasy or invention.

Learning Sites designs and develops educational and research software using interactive three-dimensional digital models that are based on actual archaeological evidence and that are reconstructed with the highest standards of scholarship. We integrate archaeological data with advanced computer graphics to further education, data analysis, and the preservation of cultural heritage information. We aim to create a globally integrated and interactive network of linked virtual worlds that can be used for teaching, research, archaeological fieldwork, and museum exhibitions.

Our software provides a dynamic medium for promoting awareness of past civilizations, understanding of different cultures, and appreciation of different places, peoples, and their cultural heritage. Learning Sites is committed to producing serious educational and research tools as we work toward virtual reality-based schooling and digital archaeology for the 21st century.

## A Virtual Reality-Based Education Package

We have begun to achieve our goals by constructing several interactive archaeological virtual environments. Users may navigate freely within the 3D models and, with the click of a mouse, access reference databases of text, images, or sounds that give information about the scene. Our current education package is based on virtual worlds representing the Hellenistic Greek farmhouse found at Vari, near Athens. The farm once belonged to a family of beekeepers, an unusual archaeological find, which lets us explore many aspects of ancient Greek daily life and culture. The complete virtual environment incorporates multimedia interaction and demonstrates the capabilities of linked worlds. Figure 1 shows the Vari House 3D models as excavated and reconstructed. The site also contains high-resolution models of some of the artifacts that were found in conjunction with the house. Virtual

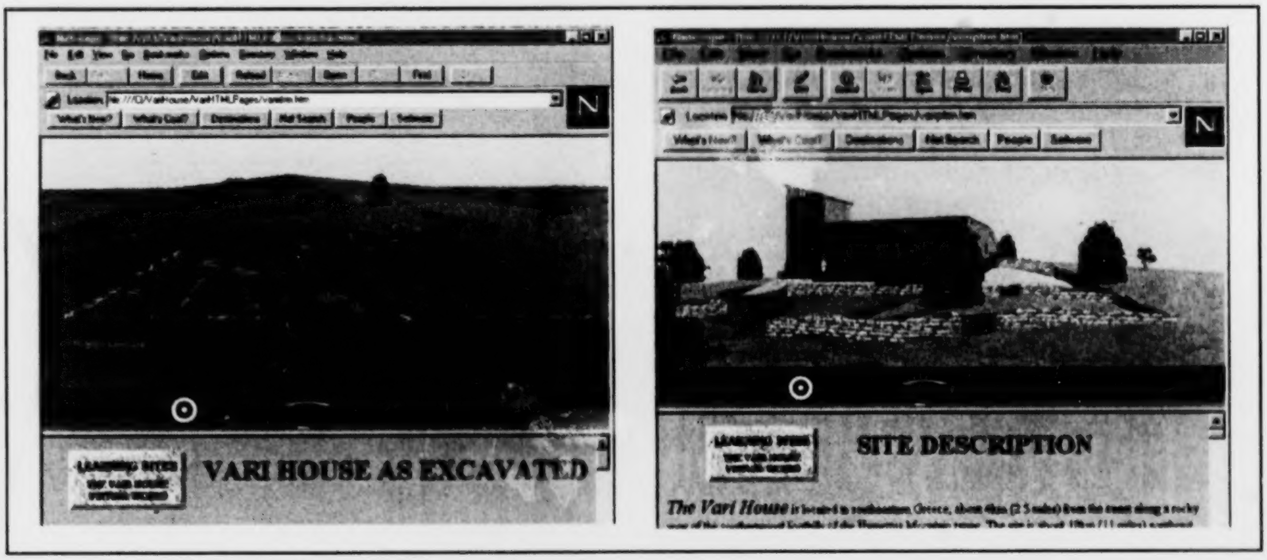

*Figure 1. 3d virtual models of the Vari House excavated and restored*

visitors can hear the bees buzzing about when they go to the page about beekeeping, hear the courtyard door creaking shut when they visit the courtyard, study and help interpret the archaeological evidence, and learn how to analyze architectural details in terms they can understand. Figure 2 shows students exploring the site.

Our education package includes directions for online access to the virtual worlds and the software necessary to run them, student worksheets, and an extensive teacher guidebook that incorporates curriculum-based objectives, lesson plans, question and answer sections, print copies of the online text documents, bibliography and glossary, and a brief history and description of virtual reality. Add-on modules about archaeology, Greek history, and VR are available for teachers not versed in those areas. Because Learning Sites databases are independent of the virtual worlds at the program level, the content of the worlds can be tailored to suit the needs of specific constituencies, such as K–12 pupils, graduate students, scholars, or the general public.

## Using Hyperlinks

To meet the challenges of benefiting public education, interactive networked virtual worlds must be available on platforms affordable to schools and museums. Such worlds, once found only in the domain of workstations and high-end computers, are now available to nearly anyone through the advent of the Virtual Reality Modeling Language. VRML makes possible the inclusion of 3D models in multimedia environments on systems that are within the financial range of our target audiences (and allow for the eventual benefits of distance education). Right now, thanks to VRML, the full power of 3D environments can be combined with the full power of multimedia to create an unrivaled learning experience.

Previous virtual reality environments have emphasized real-time response and the immersive qualities of the experience. However, the wider application of those virtual worlds for education or research is limited because of the following considerations:

1. Expensive hardware is required to render the complex, highly textured 3D scenes in real time.
2. Text display is rudimentary, usually limited to static scanned images or cumbersome extruded 3D text.
3. Users are unable to scroll or browse text or pictures within these types of 3D environments.

VRML has changed that, making possible the integration of 3D data, standard HTML 2D text, pictures, and video into a World Wide Web page. Advanced features, such as frames and multiple windows, permit simultaneous browsing of 3D and 2D information. Three-dimensional environments can now be used for what they do best: allow users to gain a full understanding of a spatial structure through self-directed exploration while retaining all the power and detail provided by the 2D text and graphics of standard Web pages.

Links between 2D and 3D data make it possible to click on a specific detail in the 3D environment and either switch to a different 3D model or bring up supporting text or pictures in a separate frame on the same window or in a different window. "Hot spots" in the text can affect the 3D portion of the screen and "hot objects" in the 3D environment can access and change the text and graphics in the Web page. The experience is a self-guided exploration of 3D information (such as our reconstructions of an archaeological site) with dynamic interaction between the user and the environment. Objects can move, change, and react to the user. Sound can provide ambient context and additional information through narration.

In our current worlds, HTML pages provide the curriculum framework. Features such as frames, anchored viewpoints, and labeled locations allow us to create various self-guided explorations of the site, each emphasizing different aspects of the data, from the daily life of the farmer to archaeological methodologies. We have designed the HTML and VRML source files to allow the user to explore freely, while ensuring that the information provides a coherent learning experience.

## The Classroom of the Future

Our primary audiences are schools (especially, but not limited to, Grades 5–12), museums (especially for exhibitions, publications, and education), and archaeologists themselves (especially for publication, data analysis, and

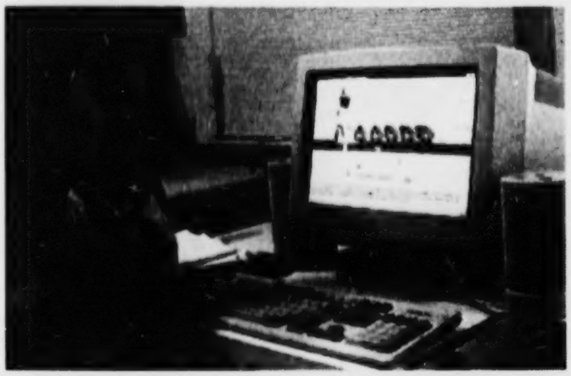

*Figure 2. Students explore the Vari House virtual world*

alternative visualizations). Interactive, multiuser virtual worlds, delivered over the Internet, place the coming electronic revolution in public education nearly on each school's doorstep. We provide virtual environments for the place, time, or culture being studied, and numerous subjects, such as history, geography, archaeology, or astronomy, can be taught using the virtually real-life situations and settings that are based on the accurate reconstructions of archaeological sites.

For future classrooms, interactive, networked, virtual reality-based education can enhance students' learning in a variety of ways by doing the following:

- Offering vicarious firsthand experiences otherwise beyond their reach or their school's ability to provide.
- Providing interaction with geographically or temporally remote locations, people or objects.
- Providing information at levels of detail tailored to individual needs.
-

Schools will find the computer-linked future classroom financially efficient as well. With access to online teaching materials, each school system need not compile complete sets of instructional materials or full libraries, in the traditional sense; and with worldwide connections, a virtual environment can link students voice to voice and eye to eye with the best instructors and teaching aids in the world. These are tremendous opportunities, and although the promise of educational reform and revolution have in the past been overstated and oversimplified, we believe that judicious use of networked virtual reality technologies can indeed make a difference.

To ensure that our materials are not created in a vacuum, we (a) consider the guidelines set by professional archaeological associations for teaching archaeology in public schools; (b) ensure that our worlds meet the stipulations for educational software set by the Virtual Reality and Education Laboratory (East Carolina University); and (c) seek out the advice and guidance of teachers, educators, and administrators so that we can tailor our instructional materials to specific local or state curriculum objectives. For example, competency goals for ancient history, geography, and world cultures are integrated into the problem-solving tasks linked to objects in our virtual worlds. Complete instructional packages are organized with teacher input regarding lesson plans, guidebooks, and adjunct materials. With this support and understanding, both the thrills and relevancy of VR-based education can become a reality.

## Conclusion

We envision a broadly encompassing circle. Digital documentation methods will allow archaeological fieldwork to be entered directly into bidirectional databases as excavation progresses. Field archaeologists will be able to access virtual worlds based on this information during excavation, while feeding new data into the system, which in turn allows continuous updating of online teaching aids. Thus, in the big picture, architects, archaeologists, engineers, computer technicians, software designers, and telecommunications experts will collaborate in constructing multidimensional libraries that will become the foundations of future virtual environments. The use of virtual reality and the Internet as the ultimate vehicles of this data and its interactivity now makes possible a globally integrated symbiotic system for the enhancement of public education, public awareness, and interdisciplinary research.

> *OK, class. You, other seventh graders from another middle school (who are waiting online), and a professor standing by from the University of Athens will all meet at Vari for a 20-min tour, during which the professor will show you how the climate of ancient Greece influenced the form and materials distribution at the Vari farmhouse.*

***Donald Sanders**, Learning Sites, 151 Bridges Road, Williamstown, MA 01267; dsanders@learningsites.com*

Note: To access the virtual worlds on the Learning Sites Web page, you must have a PC running Windows 95 or Windows NT with Netscape Navigator 3.0 or higher and Cosmo Player 1.0 beta 3 or higher installed. For more information about Navigator or to download the latest release, go to the Netscape home page at http://home.netscape.com/. You can download Cosmo Player from http://www.sgi.com/Products/cosmo/.

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HyperNexus Volume 7 Number 3

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ISTE's newest special interest group brings together educators who use hypermedia and multimedia.

HyperSIG provides a forum for the exchange of ideas, collecting and disseminating information involving the use of hyper/multimedia in the classroom. Leading the way in assisting in the development of the use of hypermedia in education, this SIG is for the educator who wants to stay abreast of the field.

*HyperNexus: Journal of Hypermedia and Multimedia Studies* is the journal for the SIG. Published quarterly, *HyperNexus* brings together new ideas, new ways of thinking, and prominent voices in the area.

**Share your expertise!**

## Submission of Manuscripts

*HyperNexus* is published quarterly by the International Society for Technology in Education Special Interest Group for Hypermedia and Multimedia. *HyperNexus* seeks articles on K–12 and college instructional applications of hypermedia and multimedia in teacher presentation and student learning. Case study product reviews are welcome.

Two double-spaced hard copies of manuscripts with screen dumps and an ascii file (noting platform and wordprocessor used) should be sent by land mail. Include your name, address, phone, and e-mail address. Receipt of manuscripts will be acknowledged electronically.

Send manuscript package to the editor:
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# HyperNexus

## Journal of Hypermedia and Multimedia Studies

Volume 7 Numbe [illegible]

**In This Issue:**

**Hypermedia and Reading, LinkWay Scripting**
**Electronic Publishing, Guest Editorial**

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**Publisher**
International Society for Technology in Education

**Editor-in-Chief**
Gertrude (Trudy) W. Abramson, EdD
School of Computer and Information Sciences
Nova Southeastern University
954/262-2070
abramson@scis.nova.edu

**Contributing Editors**
George K. Fornshell, PhD
School of Computer and Information Sciences
Nova Southeastern University
gforn@scis.nova.edu

Marlyn Kemper Littman, PhD
School of Computer and Information Sciences
Nova Southeastern University
marlyn@scis.nova.edu

Paola Williams
Punahou School
Honolulu, HI
pwilliam@lava.net

**Publications Coordinator**
S.M. Summerlight, ISTE

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Anne Rothlisberger, ISTE

**SIG Coordinator**
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*pwilliam@lava.net*

George Fornshell
*gforn@scis.nova.edu*
954/262-2074

Mark Horney
*mhorney@oregon.uoregon.edu*

Caroline McCullen
*caroline_mccullen@ncsu.edu*

Marilyn Nagano Schlief
*mschlief@nea.org*

Susan Veccia
*svec@loc.gov*
*202/707-6151*

Trudy Abramson, *Editor-in-Chief*
*abramson@scis.nova.edu*
954/262-2070

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# ■ The Editor's Pulpit

*Trudy Abramson*

## School as Scavenger Hunt

An advertisement featured in many educational technology publications pictures a student and a teacher looking at a computer screen. The student proclaims, "I found it!" Remember the image of children as *tabula rasa* or as empty buckets to be filled with knowledge? Now, with online technology, children can fill their own buckets while the teachers guide them from the side. It is almost scary how much information is available with such easy access. Why are we not becoming smarter? more accurate? more efficient? Logically, achievement scores should be soaring, and college-entrance requirements should be rising. Pragmatically, neither condition obtains.

Everyone is busy climbing on the interactive communications bandwagon. Some students talk to scientists online during the school day. Others edit one another's work across the globe; there is no one to poke or pinch, so classroom management is improved. Library resources are as close as the classroom computer; goodbye library shelves, card catalogs, and indexes. Using an online library, students type keywords and the phrase "I found it!" resounds in school halls everywhere. "What did you *learn* in school today?" gives way to "What did you *find* in school today?" We are, however, in danger of becoming a nation of high-tech dodos. Remember—searching, finding, and retrieving are preliminary steps in the teaching and learning process. Teachers, don't allow yourselves to become overwhelmed by the information glut! Lead your students through the processes of analysis, synthesis, evaluation, and judgment. Information provides a foundation for *learning;* beware of school as scavenger hunt.

Earlier issues in this volume featured Web sites developed by both teachers and students. Much content was displayed, as were links to related information. A major advantage of Web-site management is the ease of updating. The downside, of course, is that updating must be done in real time. The teachers whose sites were considered for publication have asked to be put on hold pending revision and the end of classes in June. Additional sites will appear in Volume 8.

How do you and your students build on the information you find online? Do you use other technology tools to manipulate the information and turn it into observable performance-based learning? The readers of *HyperNexus* are eager to replicate your successes and avoid the pitfalls of failed experiments. Use this venue to help move technology-based learning forward.

Help us extend "I found it!" to "Look what we do with it!"

### In This Issue

This issue completes Volume 7; it includes a letters page and an index as initiated in Volume 6. One step at a time, we are building an impressive resource to serve the growing HyperSIG well. Volume 5 had two issues, Volume 6 three, and Volume 7 four issues appearing at quarterly intervals. As per the suggestion of Contributing Editor Marlyn K. Littman, Volume 8 articles will include keyword lists following the title and author information. We would like to take this opportunity to thank our editors, our publishing staff at ISTE, and, most of all, our members, who have contributed meaningful, useful articles to *HyperNexus.*

As technology-using educators, we frequently deal with the quandary of extinct software. Is it possible for a product to have residual life after its producer or vendor has abandoned it? What makes a product live? For one thing, it must meet a recognized need. LinkWay 2.01 is a basic hypermedia program complete with paint program and text editor. It has 256 colors, child-appropriate fonts, and can do almost anything a high-tech program does. It works well with 386 DOS computers and everything above that. It has been packaged on many school-based LANs and is lying unused and forgotten in schools across the country. IBM Educational Systems became EduQuest became something else and LinkWay was left to wither away with other DOS-based software. It is an easy-to-teach, easy-to-learn programming environment that allows children to assemble the work they have found, analyzed, synthesized, and so on. It can do a great deal more. See Ken

Janowiak's work in this issue before placing a flower on the grave of this pioneering hypermedia product.

**Paola Williams**, HyperSIG Chair, is delighted that we have produced four issues this volume. However, that means she has had to write four messages. This one may reach you after NECC '97; it was written in April. To avoid the creation of a time warp, she has creatively submitted a different kind of message, an online collaboration across the globe.

**Ken Janowiak** has created a LinkWay application that guides students in the construction of a 3×3 magic square. This article illustrates the product and traces the development process that includes the LinkWay scripting. In the future, we will have online links that allow readers to visit the products described.

**Kevin Andreyo** continues his review of books that help teachers use HyperStudio as a learning tool. In conversation, he related his experiences introducing more than 800 teachers to the product. His knowledgeable review should be helpful to all. Our apologies to him for the disappearance of the illustrations that accompanied the previous review.

**Beva Eastman** describes a cooperative initiative that has resulted in the publication of an electronic journal, NJECHO, a forum for K–12 student work in New Jersey. Based in HyperStudio, this work is published on floppy disk for widespread distribution to schools across the state.

**Rhonda Richards** summarizes a pilot study that looked at the potentials of hypermedia links, such as sound and graphics, to help disabled readers learn to read. This article is a little more research-oriented than *HyperNexus* usually presents, but it is truly worth your time.

**Ed Crowley** reviews *Critical Mass*, a living history CD for adults. His keen analysis and comprehensive summary is paralleled by personal observations and reactions to the materials reviewed.

**Rockley Miller**, editor of *Multimedia Monitor*, has given permission to reprint one of his thought-provoking editorials, "Air in the Box." His words provide needed closure to this very editorial.

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Vicki F. Sharp
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# ■ Message From the Chair

Paola Williams

## Online Peer Support

This is the fourth message from the Chair this year, and you will probably be reading this during the summer. I hope your vacations are invigorating and that you are reflecting on your past year and getting ready for the new one around the corner.

These days, I spend a lot of time online developing various types of collegial relations. The electronic environment has made it possible for teachers to be included in conversations with other colleagues and newfound mentors. Teachers are thus flourishing as researchers, mentors to their students, and lifelong learners.

Here are some questions I have been pondering: Has electronic collegial sharing improved educational practice among teachers? How has teacher and student communication assisted students in reaching higher goals? In what ways have teachers worked to strengthen community support for education through collegial associations?

The following exchange is an example of the collegial sharing that takes place regularly when teachers have the opportunity to share ideas while helping one another develop professionally.

Editor's Note: In Hawaii, the word *aloha* serves as hello and goodbye. *Mahalo* is another way to say goodbye.

Aloha Paola,

*You probably don't remember me, but I met you at your school a couple of years ago through the Hawaii Association of Independent Schools (HAIS). I am on sabbatical this year from my School studying to get my Master's in Educational Technology at the University of Alaska Southeast. I was so happy to see a name I recognized in the NECC '96 Proceedings when I was looking for information on how the Internet enhances teaching and learning for children. I have a few questions for you. What is the latest information you have about technology literacy? How does technology literacy differ from media literacy? Would you consider keyboarding a necessity, particularly at the younger grades, say grades K–3? How did you hook up with Caroline McCullen and the MidLink Magazine?*

*Hoping to hear from you soon.*

*Mahalo, Rebecca*

*PS. How is the weather? I miss the sunshine here.*

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Spring Semester 1997

Aloha Rebecca,

Sorry it has taken me so long to respond to your questions. It is very busy around here, as you know when you are teaching . . . it gets crazy. Lots going on at school, as usual, but I thought your questions wonderful and will just brainstorm some ideas I have about your topics, if that is okay. . . . Mostly ramble a bit. . . .

The latest information about technology literacy would have to include all those things one does with the net . . . managing information. For instance, it's not enough to be able to log into the Internet . . . or the Web, one needs to have very specific skills on how to navigate in a nonlinear environment. Kids do this all the time when they channel surf on TV. . . they can watch two or three shows at a time and know the plot for all three. In the business world we call this multitasking . . . but when it's kids and adults don't get it, we say they have a short attention span, which is completely incorrect! They just absorb information faster than older people who have been trained and practiced in linear, sequential thinking.

Now, the Web is completely nonsequential, and as the name implies if you want to get back from where you came . . . you'd better have held on to that piece of information somewhere in your head, . or you are lost. . . . Does this sound familiar? In addition, to be literate, one has to know how to ask questions. That is, if you are doing a search on the net . . . it's not enough to just type India . . . that would be crazy. . . . What do you want to know about India, and what do you need to put in order to get back anything that resembles the information you intended to research? In computer circles, we call this Boolean logic . . . but most teachers do not teach this to kids, because in fact they have no clue that it exists. . . . So when you talk about technology literacy it includes asking questions and framing questions so that the return is predictable to some extent. It means developing skills in nonsequential thinking. It also includes evaluative skills. How can we (students and teachers) evaluate a Web site for its content, design, accuracy? We need to develop some visual literacy here. . . . Wow, a whole other area to talk about.

I think the second part of your question, tying the two literacies is very thoughtful . . . obviously, I just mentioned a third . . . so media, technology and visual literacies are difficult to separate because we see their merging together in this new place called cyberspace. . . . Maybe we just need to redefine what it means to be a literate individual in the 21st century. . . . I don't think our kids will have a problem, because truly this kind of learning takes place OUTSIDE of school, it's too bad, but school is usually the last place kids learn anything they find useful. . . . I think we need to change this . . . but I may be alone on this one.

I think keyboarding is a skill kids need to pick up along the way . . . and if that means that we start using keyboards at about the same time they start taking piano lessons, that seems appropriate. . . . Kids will type because at some point it will be easier than writing and then typing again. . . .
I know kids who feel that way now. Writing is going to become an art form . . . we will really appreciate a handwritten note or letter as an act of giving because it will be very unique in the future.

How did I meet Caroline McCullen and get involved with MidLInk? Well, sort of the same way we are meeting *grin*—I belong to many listserv(s) and one summer, many folks were conversing on a list about Hypercard. I wrote something about what I was doing with my 7th graders at school. Caroline had heard of the school and of course, Hawaii is such a hook as you know for people dropping you notes . . . they all want to know if we still live in grass huts! We starting talking about what we did in our spare time (ha ha) and she was just thinking about starting MidLink and asked if I wanted to help. I said, yes, of course—I always say yes, you can't imagine what trouble that gets me in :-)—and there is the story. . . . She has made history, and I'm just along for the ride . . . a great ride I must say . . . she is a fabulous person and when we finally met in Minn. for NECC '96, it was "chicken skin" time. . . . We had never met in person, nor had we ever even talked on the phone! It was great.

Well, I do not know if I have just rambled on and on . . . but I would be glad to talk more, and hope to see you when you get back to the islands. This must be quite an adventure for you.

Aloha, Paola Williams
pwilliam@lava.net

Rebecca and I corresponded regularly over the year. I look forward to seeing her when she completes her degree and returns to Hawaii. I value the exchange we had and look forward to new friends and associates as I extend my collegial reach all over the world. Sometimes I find it amazing that I can be reached and reach so many people and that my concerns are so similar to others in my field. I guess what I appreciate most about my exchanges with colleagues is the synergy that comes from our shared knowledge . . . and what could be better for our kids when we get back in the class room just around the corner?

# Air in the Box

*by Rockley Miller*

Judging from the content of this issue, the focus of multimedia obviously has shifted to the World Wide Web. That is where the action is. That is where the hype is. And that is where the marketing is now concentrated. And when viewed from the marketing perspective, perception is reality.

No one can doubt that when it comes to multimedia, the realities of online capability are slowly catching up to early marketing promise. They aren't here yet, but we are headed in some fairly clear directions of improved tools, interactive functionality, and both broadening bandwidth and new tricks to get more out of the bandwidth we have.

This shift toward online thinking certainly has its upsides. The economics of such distribution are compelling for content originators who see themselves able to dispense with the myriad expenses and middlemen involved in physical packaging and retail distribution—resulting in products that can be sold at lower cost and equal or increased profit. That is also good news for the consumer, who gains at least part of the benefit of these efficiencies in terms of lower costs and faster, more convenient access.

But evolutions of this magnitude usually leave premature casualties in their wake. In this case, the biggest casualty for multimedia is found in the market for physical-media-based titles, primarily CD-ROM now but soon to include DVD. With all of the attention on the promise of online, the perception has already begun to permeate certain markets that physical media in general are on their way out. Passé. Old technology.

Producers of such titles are being forced to migrate their content to either online or hybrid delivery, whether or not the online channel is ready to duplicate the performance they have achieved with CD-ROM (usually not) or whether or not the online architectures are in place to support the business models necessary to amortize the development costs (also usually not). But the market speaks, and they must listen.

So far, though, the market is speaking out of both sides of its mouth. On the one side, it says it is no longer willing to buy the physical titles (at least not in the quantities projected by the purveyors) because it perceives that things are shifting online. Thus, the physical title market begins its shakeout and repositioning. Companies such as Philips Media suffer major layoffs (the most recent of many industrywide). Only a small percentage of larger players manage to profit from CD-ROM sales. Yet the same market that has begun to eschew physical media has yet to embrace the concept of paying for content on the Web. Getting connected is seen as an end point in and of itself, not merely a new channel through which to spend more money. Suddenly the content is supposed to be free—to appear magically out of respect for your $19.95 per month flat-rate access fee. Or to be ad-supported. Or to be bundled in another layer of flat-rate add-on like the premium channels on cable.

This is the downside of proposals such as that put forth by the Clinton Administration for getting every school connected. Not that the goal is unworthy. It just tends to fuel the idea that merely getting connected is the answer, not merely a beginning. Resources that might have been directed toward purchasing content for schools are now being shifted to purchasing connectivity instead. The developers of educational content are caught in the middle. Schools are hesitant to invest in the old content form factor but aren't yet prepared to invest in content via the new. A similar trend is happening in corporate training departments. Lured by the promise of online efficiencies, they are avoiding investing in CD-ROM based solutions. Yet the online option isn't quite ready to deliver on its promise. The marketing is still a little ahead of the reality. Customers thus freeze in place.

My fear is that in the online environment the focus will shift from the actual value of content to the perceived value of mere connection. That pedagogy will fall prey to process.

It is a common observation in the retail market that the competition for shelf space is a major choke point in CD-ROM distribution. Yet the bulk of that shelf space is taken up by the air in the box. And the air is necessary to support the perceived value of the product inside. It's called merchandising. The packaging lends substance to the product.

What we need desperately to discover is the online equivalent of air in the box. A means of packaging that lends product definition and substance to the content to be delivered. Only then will the idea of purchasing content regain center stage in this shifting multimedia marketplace.

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# Using Scripts in LinkWay

*Kenneth Janowiak*

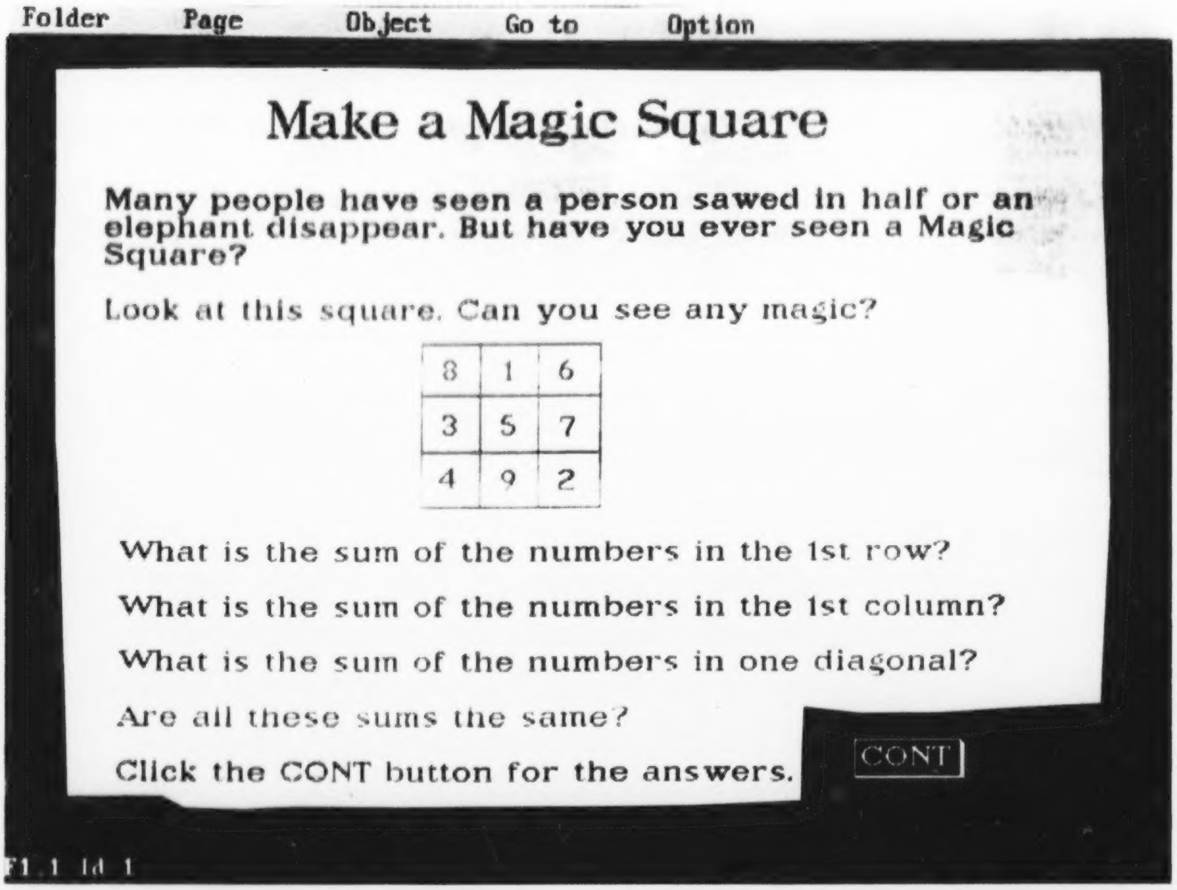
## Introduction

Creating magic squares can be one of the most interesting activities for students and teachers. Magic squares provide another way for students to practice arithmetic and algebraic skills. Students are intrigued that numbers can be arranged in ways that have so many properties. One of the best sources for magic squares of all sizes is the classic *Mathematical Recreations* (Kraitchik, 1953). Another book on mathematical recreations and problems that treats a 3×3 magic square is *Eureka* (Seymour & Gidley, 1967).

Although some mathematics teachers present magic squares as a regular classroom activity, the availability of computers allows students to learn about many topics like this on their own. As reported here, a LinkWay presentation was created to enable students to learn how to construct a 3×3 magic square. The following explanation will concentrate on using LinkWay scripts to keep track of a user's correct responses and to show the count of these correct responses on a thermometer-like display.

## Design of Presentation

The LinkWay presentation comprises three folders. The first folder (F1) introduces the user to a magic square. The second (F2) presents the creation of a 3×3 magic square in a step-by-step fashion, and the third (F3) has all the screens that will be shown if the user answers any question incorrectly (see Figures 1 through 3).



Make a Magic Square

Many people have seen a person sawed in half or an elephant disappear. But have you ever seen a Magic Square?

Look at this square. Can you see any magic?

| | | |
|---|---|---|
| 8 | 1 | 6 |
| 3 | 5 | 7 |
| 4 | 9 | 2 |

What is the sum of the numbers in the 1st row?

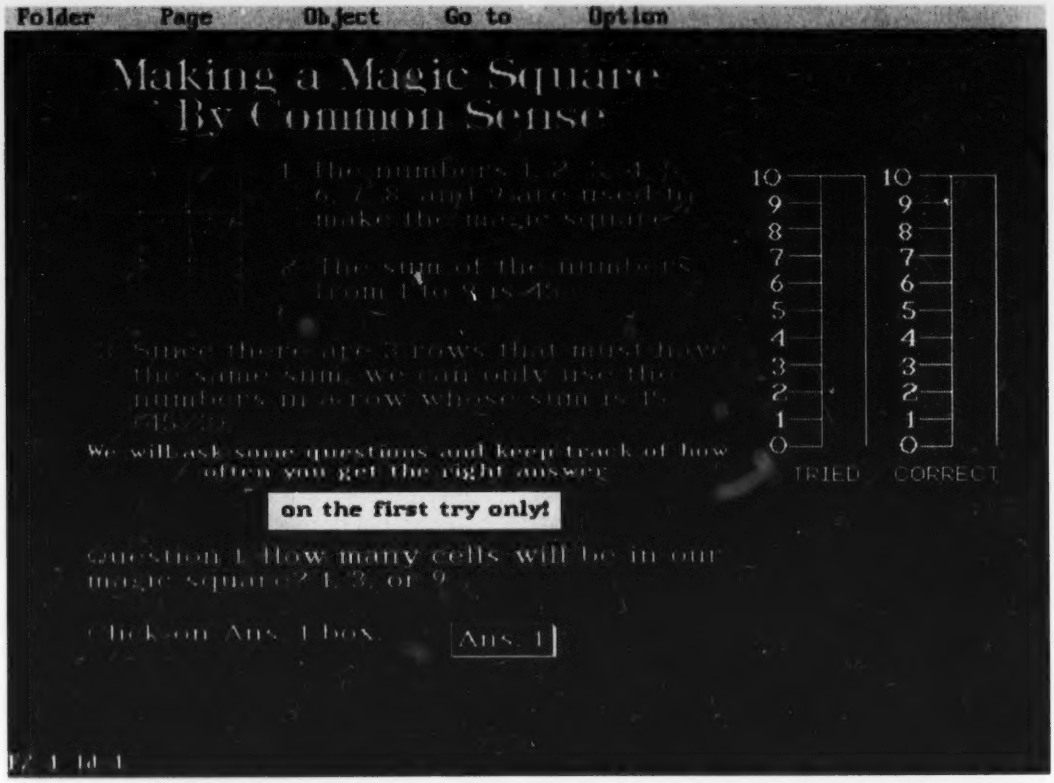
What is the sum of the numbers in the 1st column?

What is the sum of the numbers in one diagonal?

Are all these sums the same?

Click the CONT button for the answers.

*Figure 1. Page 1 of Introduction folder*


Folder
Page
Object
Go to
Option
10
9
8
7
6
5
4
3
2
1
0
TRIED
CORRECT
F2.1 Id 1

Making a Magic Square
By Common Sense

1. The numbers 1, 2, 3, 4, 5, 6, 7, 8, and 9 are used to make the magic square.

2. The sum of the numbers from 1 to 9 is 45.

3. Since there are 3 rows that must have the same sum, we can only use the numbers in a row whose sum is 15 (45/3).

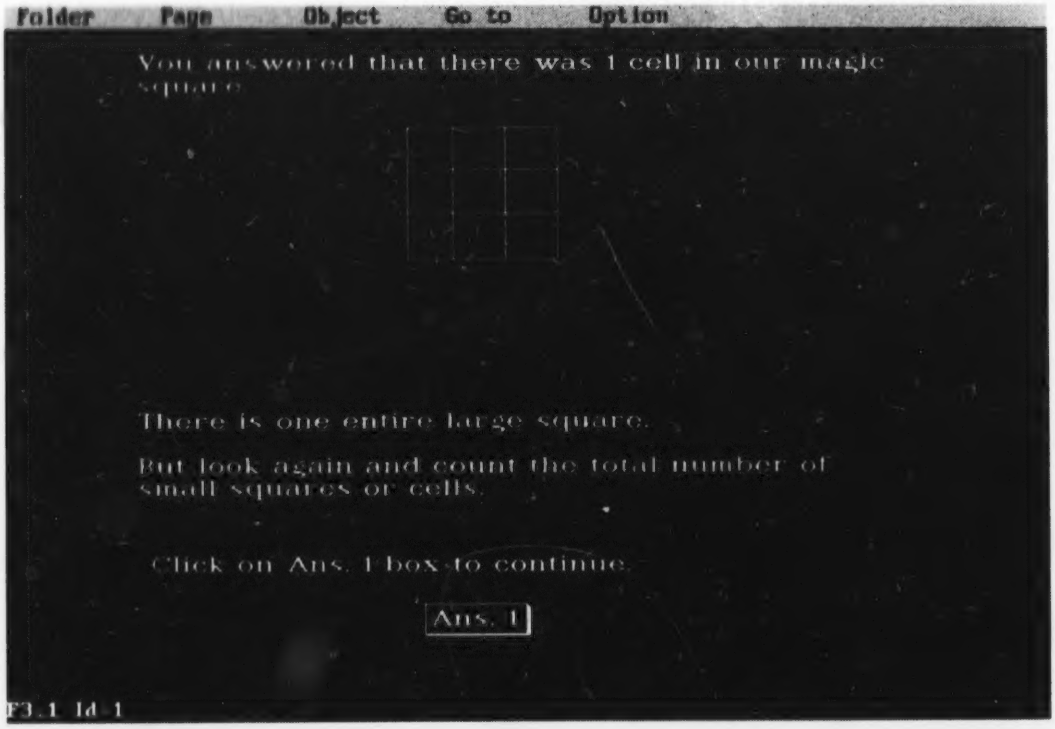
We will ask some questions and keep track of how often you get the right answer

on the first try only!

Question 1. How many cells will be in our magic square? 1, 3, or 9

Click on Ans. 1 box.

*Figure 2. Page 1 of explanation folder*


Folder
Page
Object
Go to
Option
Ans. 1
F3.1 Id 1

You answered that there was 1 cell in our magic square.

There is one entire large square.

But look again and count the total number of small squares or cells.

Click on Ans. 1 box to continue.

*Figure 3. Page 1 of incorrect answers folder*

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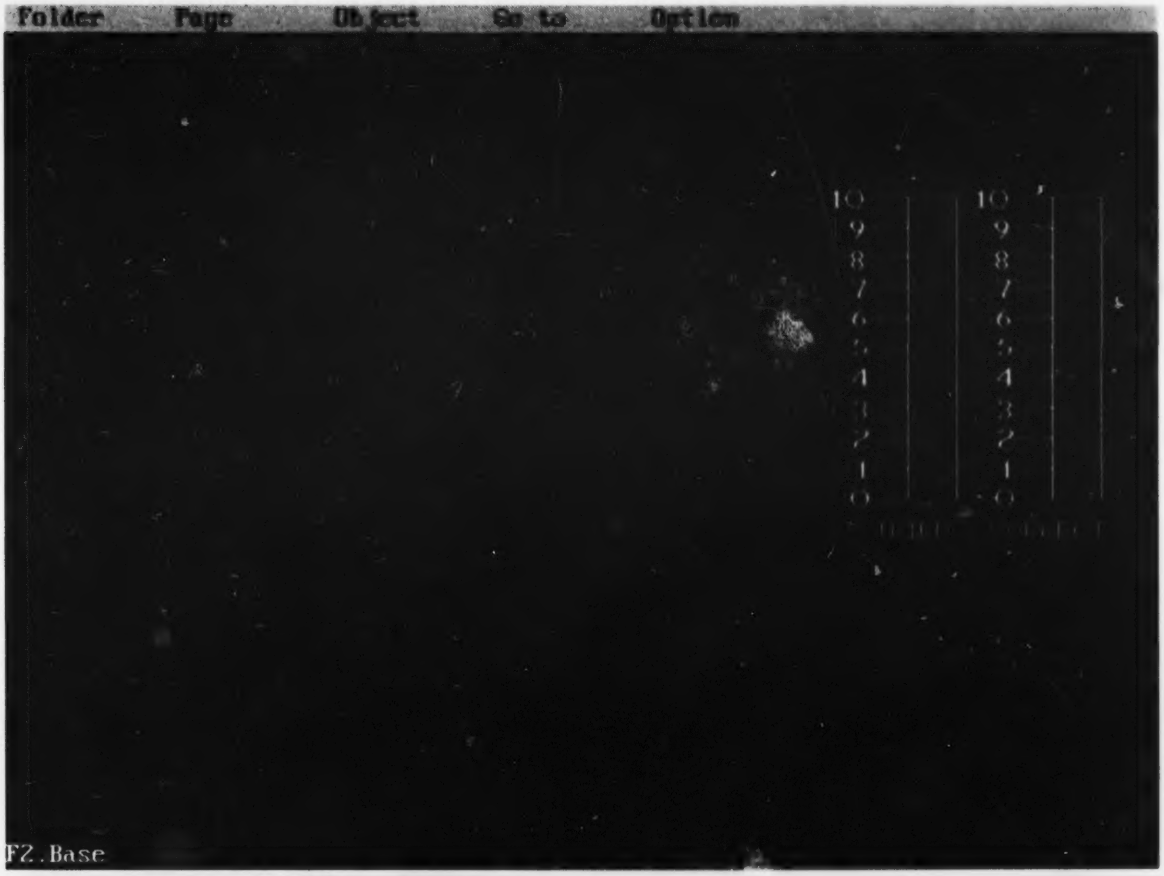

*Figure 4. Base page of explanation folder with progress thermometer*

The use of three folders for this presentation is important. The first folder loads quickly because it has only three pages. This procedure is desirable not only when using an authoring tool but also when designing for World Wide Web pages. A user does not want to wait long for the first encounter with a presentation.

The thermometer graphic is placed on the base page of the second folder so it repeats on each succeeding page (see Figure 4). This repetition serves three purposes:

1. The creator of the presentation needs only to place the graphic once for all pages.
2. Writing the script to place the bars of the thermometer is simplified because the sides and bottom of the bars have the same location on each page.
3. The thermometer is positioned in exactly the same place on each page, which provides consistency for the user.

The pages of the third folder (error screens) have a different color background from those of the second folder, again providing the user with consistency—a reminder of whether the last response was correct or not correct.

## Progress on the Thermometer: Writing the Script

Blue bars rise on the thermometer to indicate (1) the total number of pages of Folder 2 that have been tried and (2) the total number of responses from Folder 2 that were answered correctly the first time. The LinkWay BAR command is used to draw these blue bars. The BAR command needs five pieces of data: color of the bar, the *x*-coordinate of the left and right sides of the bar, and the *y*-coordinate of the top and bottom of the bar. The form of the BAR command is:

```
BAR color, left, top, right, bottom
```

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For example, after the user responds to the question on the first page of Folder 2, the command to show a total of one page tried in blue is:

```
BAR 1, 502, 258, 527, 275
```

Figure 5 shows the TRIED thermometer at this time. The CORRECT thermometer would indicate whether the user had answered the question correctly on the first try.

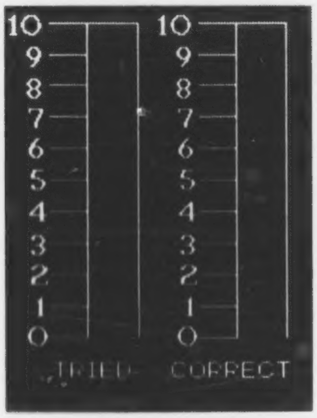


*Figure 5. Progress thermometer showing answer on page 1 tried*

There are two ways to determine the *x*- and *y*-coordinates for each position of the bar. One is trial and error; that is, one would simply test BAR commands until the correct position is obtained. This is rather time-consuming and LinkWay has a tool that can help—the TRACKER tool. Choose Object, Tools and then select TRACKER (see Figure 6).

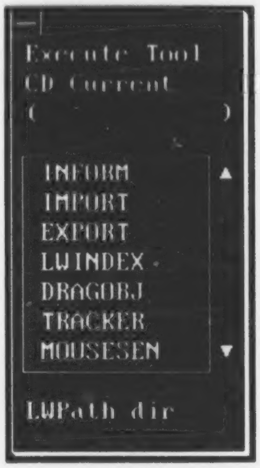
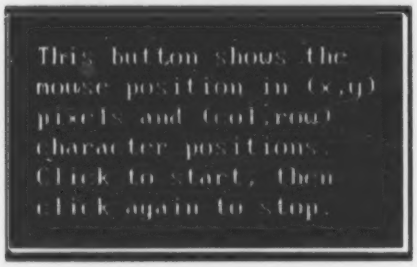


*Figure 6. Object, Tools box*



This button shows the mouse position in (x,y) pixels and (col,row) character positions. Click to start, then click again to stop.

*Figure 7. TRACKER explanation box*

After the TRACKER tool is selected, an explanation appears (see Figure 7.)

Click the mouse outside the box and move it to determine the *x*- and *y*-coordinates of a desired position. In Figure 8 (next page), the tip of the mouse arrow has coordinates (502, 275), which are shown in the lower left corner of the screen. This procedure can be followed to find all the positions needed to use the BAR command for different size bars.

Some values are the same for each display. Certainly the left and right of each bar are constants. Also, the bottoms of the bars and the height of one unit are the same. We determine that the:

Left of the TRIED bar is 502
Right of the TRIED bar is 527
Left of the CORRECT bar is 582
Right of the CORRECT bar is 607
BOTTOM of both the TRIED and the CORRECT bars is 275
Height of the bar for each unit is 17.

With this information, we can write the LinkWay script for the answer button on the first page of the second folder.

```
VAR ANS(10),TT(3),CT(3),WR(10),BOTTOM(10)
SET WR=0;
SET BOTTOM=275;
@RESPONSE
INPUT "Enter your answer: 1, 3, or 9",ANS;
IF ANS=1
{
LINK 1,"F3";
STOP;
}
IF ANS=3
```

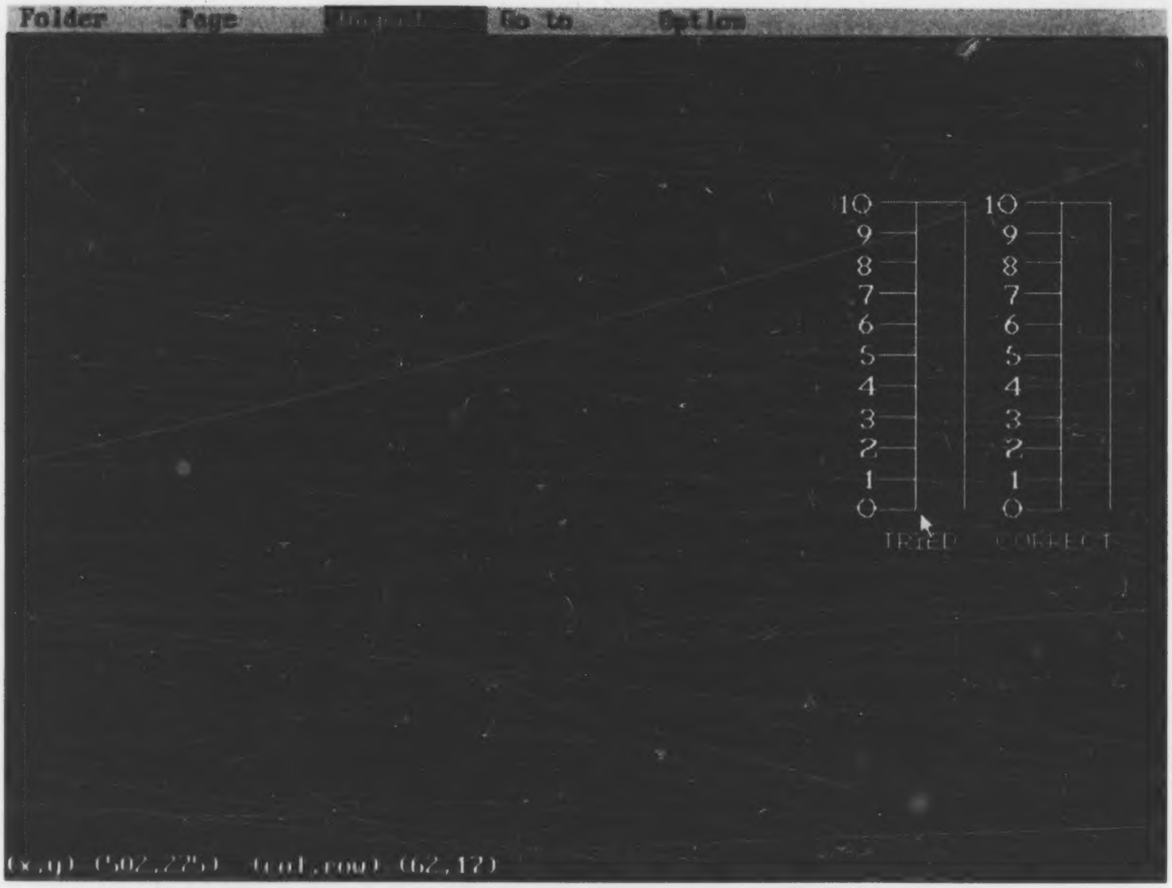


Figure 8. TRACKER tool showing coordinates of mouse position

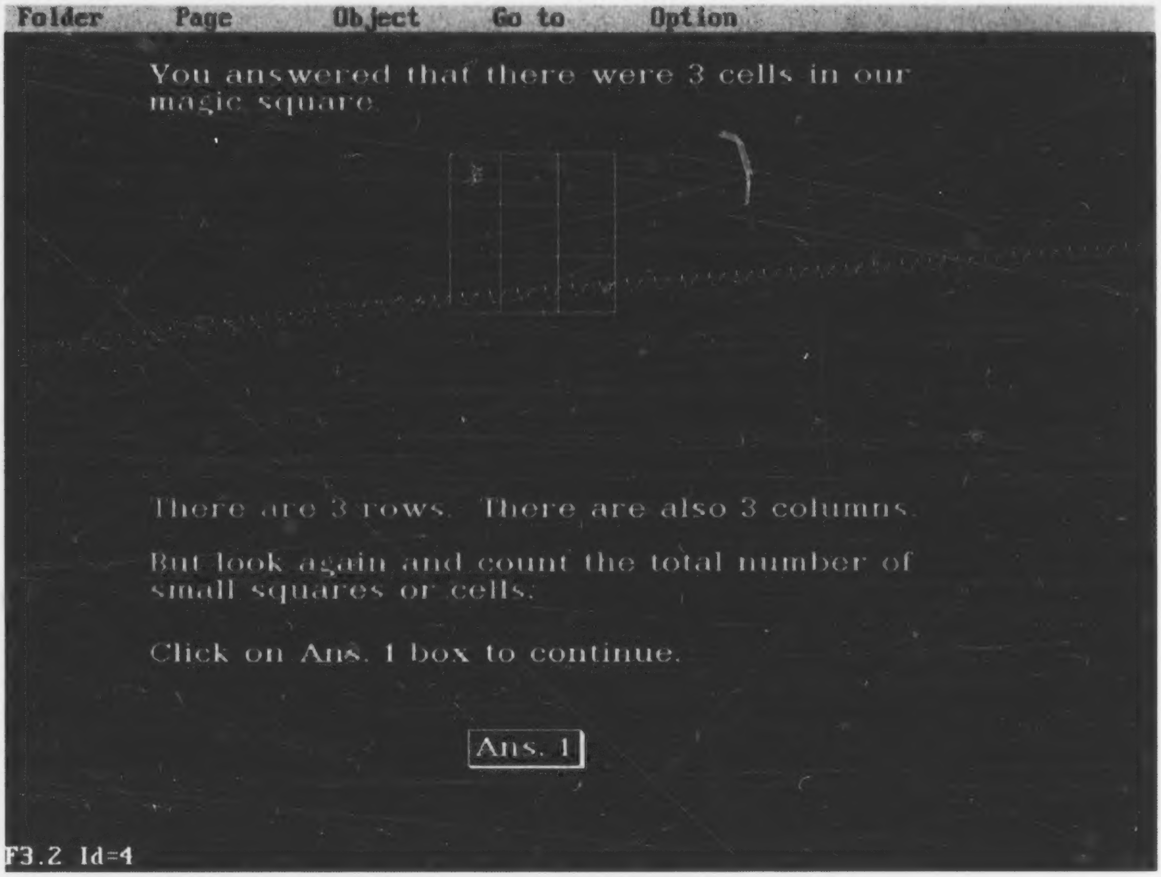
```
{
LINK 4,"F3";
STOP;
}
IF ANS=9
{
SET WR=WR+1;
GO 2;
SET TT=17*(10-WR)+105;
SET CT=17*(10-WR)+105;
BAR 1,502,TT,527,BOTTOM;
BAR 1,582,CT,607,BOTTOM;
STOP;
}
JUMP RESPONSE;
```

Let's examine this script line by line. First, the VAR statement defines the variables. ANS is the user's answer, TT is the top of the total tried bar, CT is the top of the total correct bar. WR is the total answered correctly the first time, and BOTTOM is the bottom of both bars. WR is set to zero. BOTTOM is set to 275 for all bars.

The @RESPONSE statement marks a place in the script to return to if an improper response is given. RESPONSE is called a label.

The INPUT statement asks the user for an answer that will be put into the variable ANS. If an answer of 1 is given (a wrong answer), the statement IF ANS = 1 is true, and LINK 1, "F3" will cause LinkWay to go to the page that has ID = 1 of Folder F3 (see Figure 3). If the answer 3 is given (also a wrong answer), IF ANS = 3 is true and LINK 4, "F3" causes LinkWay goes to the page that has ID = 4 of Folder F3 (see Figure 9).

If the correct answer of 9 is given, then the statement IF ANS = 9 is true and 1 is added to the number correct: SET WR = WR + 1. The GO 2 command goes to the page with ID = 2 of the current folder, Folder F2, and the explanation pages continue.



You answered that there were 3 cells in our magic square.

There are 3 rows. There are also 3 columns.

But look again and count the total number of small squares or cells.

Click on Ans. 1 box to continue.

*Figure 9. Folder F3. ID = 4 is shown when the wrong answer to question 1 is 3.*

The next two lines, SET TT = 17*(10-WR) + 105, and SET CT = 17*(10-WR) + 105, determine the top of the TRIED and CORRECT bars (17 is the step value of the bar). The two BAR statements draw the TRIED and CORRECT bars.

Finally, if the answer is not 1, 3 or 9, then the JUMP RESPONSE statement is executed and control is sent back to the @RESPONSE statement and the process continues. The STOP statements are necessary so that the script ends properly.

## Summary

The above discussion shows a few of the many things that can be done with a LinkWay script. The script for drawing a progress thermometer was shown as well as the command to keep track of the user's correct responses. A user who has had some experience in any computer programming language should be able to write LinkWay scripts. Scripts enable the creator of a presentation to do many things that are not available in the LinkWay command menus.

## References

Kraitchik, M. (1953). *Mathematical recreations*, 2nd ed. New York: Dover Publications.

Seymour, D. G., & Gidley, R. (1968). *Eureka!* Palo Alto, CA: Creative Publications.

***Kenneth Janowiak***
*Director of Computer Services, St. Patrick High School*
*5900 W. Belmont Ave., Chicago, IL 60634*
*773/282-8844; janowiak@ scis.nova.edu*

# Examining Hypertext Passages with Students Who Exhibit Reading Difficulties: A Pilot Study

*by Rhonda Richards*

Computers have played an important role in many reading programs, but one problem persists as usage fails to reflect modern theories of reading instruction. P. A. Cooper (1993) states that the earlier stages of instruction using technology in reading were behavioristic because they concentrated on mastery of basic skills that were broken into tiny segments and reinforced through immediate feedback. Students who used these programs responded without regard to comprehension, reacting to stimuli that usually resulted in hitting the keys until the chime indicated a correct response. This type of computer intervention produced little in the way of real reading gains because the programs essentially segregated the student from the reading process. In other words, the computer often controlled the reading activity, and the student responded at a passive level to meaningless instructional activities. In contrast, new emerging technologies have evolved to a level that allows for student-controlled interactive multimedia programs, with hypertext links that conceptually support constructivist theories. In this case, it is the reader who builds or constructs meaning through active decision making and interactions with the text.

## What is Hypertext?

The recent infusion of interactive multimedia into many elementary classrooms makes the examination of hypertext relevant for both teaching and learning. Hypertext links are found in many of these interactive multimedia applications, including electronic encyclopedias and living storybooks. Spiro and Jehng (1990) define a hypertext link as nonlinear text organized around multiple dimensions that are capable of being explored in many ways. In other words, a hypertext link is one that can lead the reader to another source of textual information that augments the original text. Some authors expand the role of hypertext links to include not only text, but also pictures and sounds that are organized nonlinearly into linked, weblike information (Foss, 1989; Landow, 1990; Megarry, 1988). Whether or not the link is limited to text, hypertext is a series of nodes that are linked, thus allowing the reader to follow a variable reading path of associations based on semantic links. The idea behind the hypertext link, therefore, is to provide semantically similar information to the reader that can be accessed when the reader desires it. The literature, however, is not clear whether such nonlinear branching of textual information through hypertext links is advantageous to the reader.

## Current Research

The newly emerging interactive technologies may seem to hold great promise for students with reading difficulties, but unfortunately researchers continue only to glance at interactive multimedia and the potential it holds (Whitaker, Schwartz, & Vockell, 1989). Few existing studies have investigated interactive hypertext and its effects on reading comprehension, and the studies that have been done have limited generalizability. For example, Gillingham (1992) describes the effects of question complexity and reader strategies on hypertext comprehension—but uses adults rather than children as subjects. His findings indicate that hypertext proved difficult for several subjects. Forehand and Rice (1988) investigated whether the constructs of reading comprehension were the same when presented on the computer as opposed to paper. Again, the subjects were adults, and the conclusion was that comprehension was the same regardless of presentation mode. MacArthur and Haynes (1995) used high school students in a project to determine the use of hypermedia as a text enhancer. Their study indicated students given a choice preferred hypertext-enhanced computer version to the regular textbook version. In a study with intermediate aged students, Reinking and Rickman (1990) discovered that vocabulary learning and comprehension were improved when computer-mediated texts were used to control and extend the reader's accessibility to additional information. At this time, studies investigating the use of hypertext continue to be limited, especially with elementary-aged children.

### Relevant Research Areas

It is important that we investigate the impact of hypertext and its effect on reading comprehension by looking to other research areas that may offer peripherally relevant information. The related areas cited below may offer insight into the advantages and disadvantages of hypertext.

### *Mediated Text*

Hypertext usage might be relevant to recent studies on mediated text and a student's mediated reading level, which is the highest level of text that can be read meaningfully after instruction (Powell, 1986) In this case, mediated text with hypertext links infused with "go-betweens" could mediate or serve as the instruction. To reconcile unclear or problematic areas, a mediated text may contain a sidebar with additional definitions of key words or further questions for reflection. Perhaps hypertext provides its own form of mediation; in other words, the links from the stimulus word to elaborations of that word are similar to providing a bridge between the text and the reader's understanding of it.

### *Media Psychology*

The study of synthetics in media psychology addresses how stimuli received by one sense engages a response from another sense, such as visual information coupled with an aural stimuli to evoke a multisensory response from the reader. One possible hypertext connection could be the potential of hypertext to evoke the senses and thus engage the emotional dimension. Luskin (1996) states that these responses can create sensory rivalry that may produce positive or negative experiences or reactions. The sound associated with a text link, for example, may actually interfere with the understanding or comprehension of the text, especially if the sound happens to be a musical link that is disliked by the reader.

### *Metacognition*

According to Brown (1982), metacognition is awareness of one's own activities while reading, solving problems, and studying. Metacognition affects the amount of control a reader has over hypertext links. Davidson, Shorter, and Lane (1996) found that the success or failure for student learning in hypertext environments may depend on students' abilities to activate relevant metacognitive strategies in order to monitor their learning. These researchers postulated that hypertext may actually add another level of complexity to passages being read by students. Aycock (1995) states that one reason people are not successful with hypertext is because the reader, the writer, and the text each play a different role. Not understanding these roles can result in the reader "getting lost" in the text and becoming frustrated and disengaged in the reading process. The control the reader has been granted over the text can become a burden whether metacognitive awareness or monitoring strategies. Essentially, educators may need to look beyond the glitz and glitter and realize that it is not the number of buttons a student can push but whether the technology sparks thoughtfulness and metacognitive behaviors (Dockterman, 1995).

Not surprisingly, metacognitive behaviors are often lacking in students who exhibit reading difficulties. Jonassen (1993) discovered that learners, when given control over instructional variables, do not always make the best decisions. These researchers noted that those students who need instructional support the most (such as those with reading difficulties) frequently select the least amount of aid, and those who need instructional support the least (overachievers) frequently select the most. It could be that the students did not select hypertext links that would benefit them most in their reading.

### *Vygotsky's Zone of Proximal Development*

Vygotsky's research has potential relevance for studying hypertext. One popular Vygotskian idea has been the zone of promixal development (ZPD), which is defined as that area that represents each individual's potential for development above and beyond his or her current level of functioning. Part of this notion focuses on how adults can scaffold, or establish, learning events that permit the student to engage in cognitive activities that will target the zone of proximal development. The student can perform at a developmentally advanced level when assisted as opposed to acting alone so that the learner exhibits a range of potential. Although adults help learners construct these activities, deliberate control by learners is important, especially for the learning of abstract, language-centered concepts (Krauss, 1995). Wertsch (1985) discovered that one central tenet in Vygotsky's ZPD is a claim that mental processes are mediated by tools and signs. These signs can serve as tools for regulation and mediation. The use of hypertext linkages could provide mediation that encourages students to perform within their proximal zones of development.

## The Question

To begin this investigation into the role of hypertext and comprehension, it was important to develop a research question that would address whether access to multiple sources of information through hypertext links actually improved the performance of readers who experience reading difficulties. As a result, the following question was developed:

How does performance in regular, nonmediated passages compare with performance in mediated hypertext passages for students with reading difficulties in elementary grades?

In attempting to address this question, we must examine the qualitative components of hypertext. These include: (1) the number of links available in the text, (2) the value of the information contained behind the link, and (3) the student's need or motivation to access the link. We also must determine the quantitative benefit of the hypertext links by assessing students' comprehension of the passage after it has been read.

To address both the qualitative and quantitative aspects of hypertext, a pilot study was developed and implemented. Although only limited information exists on the above concerns, previous studies (Dockterman, 1995) have addressed how interactive text should be, although specific recommendations have not been offered. Forging new ground, therefore, the pilot study sought to determine the relationship between performance in hypertext and regular text in equivalent passages read by elementary-grade students with reading difficulties.

## Method

(Editor's Note: Due to space limitations, the methods section of this paper had to be cut. To obtain the discussion of participants, instrumentation, nonmediated silent reading, mediated silent reading, the vocabulary/comprehension connection, and procedures, send e-mail to the author: richardsr@winthrop.edu.)

## Results

The results of the pilot study are discussed and analyzed according to the instructional level each student achieved in both the mediated and the nonmediated text. The instructional level is the level at which the student is expected to be successful in reading after some form of instructional intervention (Flynt & Cooter, 1995).

The data below indicate how each student performed on the passages (see Table 1). Grade represents the student's grade-placement level; ISC level represents the student's instructional silent comprehension level as represented by a grade-placement score; NM represents the grade level for silent comprehension of nonmediated text; and M represents the grade level for silent comprehension of mediated text. The number of links activated represents the number of links activated at the grade-placement level for mediated text. In other words, if a student's silent comprehension level in mediated text is grade 2, then only those hypertext links accessed at that level are reported. If the student scored below first grade on either the mediated or nonmediated passages, then the score was reported as < 1; this is because the primer level did not provide a passage that could be transferred to hypertext for use in the study. The results are presented in Table 1.

### *Number of Links Accessed*

Students 2 and 4 did not access links at their ISC(M) level. Students 1, 3, and 8 accessed every link available in the text. It is assumed but not certain that the remaining students accessed links when they were unclear of a word's meaning or pronunciation. The students who failed to access links scored the same or lower in mediated text than nonmediated text. Stu-

*Table 1. Results of mediated versus nonmediated silent comprehension*

| Student | Grade | ISC Level (NM) | ISC Level (M) | No. Links Activated | Grade Level | Increase/ Decrease |
|---|---|---|---|---|---|---|
| 1 | 2 | 1 | 2 | 7 | +1 | * |
| 2 | 2 | <1 | <1 | 0 | 0 | |
| 3 | 3 | 3 | <1 | 7 | -3 | * |
| 4 | 4 | 3 | 1 | 0 | -2 | * |
| 5 | 3 | <1 | <1 | 2 | 0 | |
| 6 | 4 | 3 | 2 | 1 | -1 | * |
| 7 | 3 | 3 | 1 | 3 | -2 | * |
| 8 | 4 | 2 | 1 | 7 | -1 | * |
| 9 | 4 | <1 | <1 | 2 | 0 | |
| 10 | 2 | <1 | 1 | 6 | +1 | * |

dents 3 and 8, who accessed every link available, scored lower in mediated text than the nonmediated text. Interestingly, students, 2, 4, 5, 6, 7, and 9 also scored the same or lower in the mediated text. Only two students, numbers 1 and 10, scored higher in the mediated version of the text. These two students, whose ISC level improved in the mediated text, accessed either all or most of the links available in the text.

Three students used the cursor on the screen to follow the text as they read silently. This was an unanticipated response; perhaps the cursor served as an on-screen pointer for these readers.

### *Analysis of Data*

A Pearson correlation matrix was developed to determine the relationship between the grade placement, the grade level on nonmediated text, the grade level on mediated text, and the number of links accessed by the student. The results of this analysis are displayed in Table 2.

*Table 2. Pearson correlation matrix*

| | Pearson Correlation Matrix | | | |
|---|---|---|---|---|
| | Grade Placement | Nonmed | Med | Links |
| Grade Placement | 1.000 | | | |
| Nonmed | 0.487 | 1.000 | | |
| Med | 0.032 | 0.393 | 1.000 | |
| Links | -0.279 | 0.039 | 0.191 | 1.000 |

The data indicate a moderate positive relationship (.487) between grade placement and nonmediated (or regular) text. The percent of shared variance, or coefficient of determination, indicates that only 23.1% of the variation in grade placement can be explained by or associated with variation in nonmediated text. This could be expected because of the below-grade-level reading performance of these students before the pilot study. The positive relationship between nonmediated and mediated text (.393) is low, which indicates that only 15.4% of the information needed to predict performance in mediated text is available to us from the nonmediated text scores. In other words, the level of performance in the traditional, nonmediated text does not have a high correlation with performance in text with the same level of difficulty that is mediated with hypertext. Ideally, one might expect at least the same level of performance in either case.

Of more significance is the very low correlation (.032) between performance in mediated text and grade placement. This lack of relationship between these two variables may indicate that, regardless of performance in the hypertext passages, grade level played a minimal role. This is in contrast to the relationship that was evidenced in nonmediated text and grade level, where a moderate relationship was observed.

## Discussion

The question addressed by this pilot study focuses on a comparison between the performance of an elementary-aged reading-disabled student in comprehending passages in mediated hypertext as opposed to regular, nonmediated text. The findings indicate that, on the whole, students' performance did not improve with the addition of hypertext links. In fact, in more than half the cases, comprehension levels actually decreased.

Discussion of this pilot study's findings cannot proceed without recognizing the limitations of the design. First, the sample size is small and so limits the generalizability of the results. With only ten cases, it is difficult to draw conclusions above and beyond the results as they are presented. Second, the instrument used to measure student's performance in the passages did not lend itself to the use of hypertext below grade 1, so students who were frustrational at grade 1 on the mediated or nonmediated passages provided little analyzable data. Third, although the students served as their own controls, other factors could have influenced the results; interest levels for the passages could have varied from Form A to Form B, for example.

Realizing the limitations presented by the study, one possible reason for some students' failure to improve their reading comprehension using the hypertext version includes the user's attention being diverted from informational features to navigational features as they accessed links. For example, color coding hypertext-linked words and making them accessible to the reader could have emphasized them as isolated units rather than on how they supported the meaning of the passage. This implies that the students are making a connection from simply navigating the link to depositing the newly acquired information into previous knowledge about the passage. The apparent failure of the hypertext links to improve significantly the comprehension scores in the mediated passages could be explained by this inability to link the resources.

Another possible cause for the lack of improvement in comprehension of hypertext passages is the lack of ability some students may have for monitoring their own learning. It is questionable whether students were judicious in deciding on which links to access. For example, two students accessed every link available in the hypertext passage, but it is not clear *why* they were doing so. The assumption is that the readers were searching for information out of a need to support their understanding of the passage, but it is more likely they were just curious or responding to a novel situation. In both instances their comprehension scores decreased. Apparently, these readers did not know how to use the additional information to support their understanding of the text.

Because the students in the pilot study were identified as having reading difficulties, their performance could have been affected by additional variables. One of these could be the instructor and the amount of support that person provides the reader. Perhaps the use of the computer as a mediator for textual understanding is less desirable than the type of scaffolding provided by an instructor who supports a student's unique needs through understanding the learner, an attribute not yet assigned to most computers. Allowing a student with reading difficulties to interact with a computer without additional instructional and hands-on support from a teacher may not be the best use of modern technology.

The passages also could have been problematic for the reader. They were chosen to assess comprehension using materials developed solely for that purpose. The text of those passages may not have engaged the learners at a level where the intervention offered by hypertext links would make a difference. If the passages had been longer or more descriptive, then the results may have been different.

## Conclusion and Recommendations

This pilot study actually raises more questions than it answers. Did the design of the hypertext passages interfere with the comprehension of those passages? Do students with reading difficulties need organizational aids that will help them successfully use hypertext to improve their comprehension? Are elementary-aged students able to use hypertext links as efficiently as older students?

To further examine these questions and go beyond the limitations of the pilot study, the study should be replicated with average or above-average readers and with a larger sample size. In addition, given the differences that might exist at an intrasubject level, a single-subject design might yield additional information that would explain the lack of relationship between performance in mediated as opposed to nonmediated passages. With the emergence of hypertext-based materials for reading, these concerns should be examined, especially as they relate to students with reading difficulties.

## References

Aycock, A. (1995). Technologies of the self. *Journal of Computer-Mediated Communication, 1*, 2.

Brown, A. L. (1982). Learning how to learn from reading. In J. A. Langer & M. T. Smith-Burke (Eds.), *Reader meets author/bridging the gap*. Newark, DE: International Reading Association.

Cooper, J. D. (1993). *Literacy: Helping children construct meaning*. New York: Houghton-Mifflin.

Cooper, P. A. (1993). Paradigm shifts in designed instruction: From behaviorism to cognitivism to constructivism. *Educational Technology, 3*(5), 12–19.

Davidson, G., Shorter, L., & Lane, J. (1996). Children's use of learning strategies and decision making in hypertext computer lessons. In P. Carlson & F. Makedon (Eds.), *Educational multimedia and hypermedia.* Charlottesville, VA: AACE.

Dockterman, D. A. (1995). Interactive learning: It's pushing the right buttons. Educational Leadership, 53(2), 58–60.

Flynt, C., & Cooter, R. (1995). *Flynt–Cooter reading assessment.* New York: Prentice-Hall.

Forehand, G. A., & Rice, M. W. (1988). Diagnositc assessment in instruction. *Machine-Mediated Learning, 2*(4), 287–296.

Foss, C. L. (1989). Tools for reading and browsing hypertext. *Information Processing and Management, 25*(4), 407–418.

Gillingham, M. G. (1992). *Goal-directed reading of complex, embedded hypertexts: Effects of goal and interest on search strategies and selective attention.* ERIC Document ED345204, Washington, DC.

Jonassen, D. H. (1993). Conceptual frontiers in hypermedia environments for learning. *Journal of Educational Multimedia and Hypermedia, 2,* 331–35.

Krauss, L. A. (1995). Partner reading and writing: Peer social dialogue and the zone of proximal development. *Journal of Reading Behavior, 27,* 45–63.

Landow, G. P. (1990) Popular fallacies about hypertext. In D. H. Jonassen & H. Mandel (Eds.), *Designing hypermedia for learning* (pp. 39–59). New York: Springer-Verlag.

Luskin, B. J. (1996). Toward an understanding of media psychology. *T.H.E. Journal, 23*(7), 82–87.

MacArthur, C. A., & Haynes, J. B. (1995). Student assistant for learning from text: A hypermedia reading aid. *Journal of Learning Disabilities, 28*(3), 150–159.

Mallett, J. J. (1977). *101 make and play games for intermediate grades.* Englewood Cliffs, NJ: Center for Applied Research in Education.

Megarry, J. (1988). Hypertext and compact disks: The challenge of multimedia learning. *British Journal of Educational Technology, 19*(3), 172–183.

NAEP. 1994. *Reading report card for the nation and the states.* Washington, DC: U.S. Department of Education.

Powell, W. R. (1986, December). *Emergent (mediated) reading levels: A new construct for placement from a Vygotskian perspective.* Paper presented at the National Reading Conference, Austin, TX.

Reinking, D., & Rickman, S. (1990). The effects of computer-mediated texts on the vocabulary learning and comprehension of intermediate-grade readers. *Journal of Reading Behavior, 22*(4), 395–411.

Spiro, R. J., & Jehng, J. (1990). Cognitive flexibility and hypertext: Theory and technology for the nonlinear and multidimensional traversal of complex subject matter. In D. Nix & R. Spiro (Eds.), *Cognition, education, and multimedia: Exploring ideas in high technology* (pp. 163–205) Hillsdale, NJ: Lawrence Erlbaum Associates.

Thorndike, R. L. (1973). *Reading comprehension education of fifteen countries.* New York: Wiley & Sons.

Wertsch, J. V. (1985). *Vygotsky and the social formation of the mind.* Cambridge, MA: Harvard University Press.

Whitaker, B., Schwartz, E., & Vockell, E. (1989). *The computer in the reading curriculum.* New York: Mitchell Publishing and McGraw-Hill.

*Dr. Rhonda Taylor Richards, Winthrop University, Rock Hill, SC; richardsr@winthrop.edu.*

# *NJECHO:* An Electronic Journal Focused on Computers Across the Curriculum

*by Beva Eastman*

With much discussion about how to use computers across the curriculum, the New Jersey Educational Computing Cooperative (NJECC) was approached by a group of teachers who wanted to demonstrate that computers were already being used creatively in the schools. Thus, with the support of NJECC, a new electronic journal, *NJECHO*, began this year.

## Purpose of *NJECHO*

The purpose of *NJECHO* is to give a forum to New Jersey's K–12 students for the new types of curriculum-based projects being developed using computers. Each month, with a different curriculum area as their theme, students' works or projects show how computers have changed the kind of assignment or activity that has led to not only new knowledge, but also a new way of learning.

## Curriculum Areas for the 1996–1997 Year

The following areas were chosen for the first year:

- computer graphics
- science K–8
- language arts
- social studies
- telecommunications
- mathematics
- reading
- music and sound
- world language

## The Project-Selection Process

An editorial committee comprising five educators selects the projects for "publication" in the journal. Four of them work in local school districts (two as computer coordinators, one as a media specialist, and one as a computer teacher), and one is a college professor.

Each issue is announced at the NJECC monthly meeting. Although some schools have incorporated computers throughout their curricula and might otherwise tend to dominate such a journal, the committee made it one of its goals to reach out in every issue to different schools at different levels of computer involvement. This outreach demonstrates that most schools in New Jersey now have computers, either in labs or within classrooms. However, because the journal is new, projects are still gathered by the committee, sometimes by proactive request.

## Platform of the Journal

NJECHO is distributed on one disk and thus is restricted to the amount of material that can fit on a high-density disk when compacted in a self-extracting file (roughly 2 MB). HyperStudio is the presentation software used for the journal, so the information about each project is transformed into a stack. Also, because HyperStudio allows other software to be accessed from within a stack and still keep the stack intact, projects employing other software such as ClarisWorks and MicroWorlds and self-running applications are used.

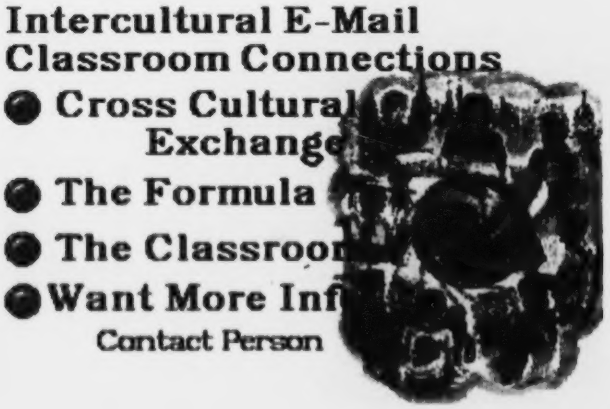
Currently, the journal is available only on the Macintosh platform, although projects from the IBM platform are welcome and have been accepted. Those projects were translated into a Macintosh form. The problem of cross-platform distribution has not been solved but remains a future goal for the committee.

### Format of the Journal

Each project has its own title page that gives four information areas:

- The Project—often an abridged version of the project
- The Formula—the assignment for the project
- The Classroom—the grade or curriculum area in which the project was implemented
- Want More Info—who the contact teacher was for the project.

For example, the following "Cross Cultural Exchange" activity from the January 1997 issue on telecommunications had the title page shown in the figure below.



**Intercultural E-Mail**
**Classroom Connections**
● **Cross Cultural**
**Exchang**
● **The Formula**
● **The Classroo**
● **Want More Inf**
**Contact Person**

The first button moves the browser to the project; in this case, it was one of the letters sent from a New Jersey school (with the names deleted):

> *Dear "name of person in Ireland",*
> *My name is "name of person in NJ". I like word games such as Scrabble, Boggle, and Trivia games like Trivial Pursuit, Mindtrap, Split Second, and Tribond. I like to watch hockey and the New Jersey Devils Hockey team are my favorite team. I also like to play soccer.*
>
> *My favorite Christmas present was a huge stuffed orangutan. I like it because it has a wise, knowing face. It's my favorite stuffed animal out of my large collection.*
>
> *I don't use many slang words except for "cool," "awesome," "dude," and "yeah, right."*
>
> *The terrain here is kind of hilly, but there's some spots where it's moderately flat. The most common animals here are deer, black bears, wild turkeys, chipmunks, and squirrels.*
>
> *There are lots of buildings. New Jersey is about 19,342 square kilometers and has 7,730,000 people.*
>
> *Now that I have told you about myself and New Jersey, please answer these questions :*
>
> *1. What are some of the games you and your friends like to play?*
> *2. What is your favorite toy you got for Christmas?*
> *3. What is the terrain like and what kind of animals are there?*
> *4. What are some slang words you and your friends use when you talk?*
> *5. How large is Ireland and about how many people live there?*

Each of the other buttons is an informational text field. "The Formula" button had the following text field:

> *Ireland, Alaska, and Australia were chosen as the three countries in the cross cultural exchange with this New Jersey school. Students developed questions for the countries, answered the questions about themselves and asked those same questions of their penpals.*

"The Classroom" button showed this text field:

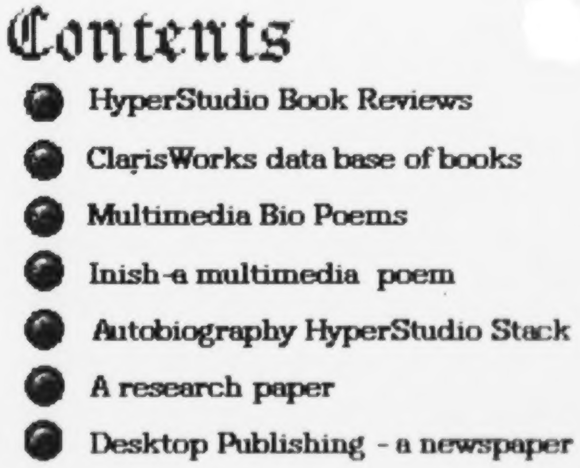
> *Three fourth grade classes correspond with selected countries to discuss and learn about the term "culture." The project is to consider differences and similarities in culture as defined through 5 particular questions.*

The last button, the "Want More Info" button, gave the names of the school and the teacher along with an e-mail address or phone number, so that teachers interested in developing similar projects in their schools have a resource person to contact.

## Range of Projects and Computer Skills

Each issue presents a range of computer software applications as well as a range of classrooms. Because New Jersey has urban, suburban, and rural school districts, projects from all schools and all levels have been used to show the state's involvement with computers.

The November journal on language arts presented seven projects that represented five different schools, both urban and suburban. The grade levels varied from 4th to 12th, and the computer software in these projects was database, presentation, and word-processing software.



Contents

- HyperStudio Book Reviews
- ClarisWorks data base of books
- Multimedia Bio Poems
- Inish-a multimedia poem
- Autobiography HyperStudio Stack
- A research paper
- Desktop Publishing - a newspaper

The January issue on mathematics showed seven projects from seven different schools. The levels ranged from 5th to 11th grade, and the schools were suburban, urban, and rural. The computer programs demonstrated were HyperStudio, Geometer's SketchPad, Mathematica, C + + programming, MicroWorlds, LogoWriter, and spreadsheets. The October issue focused on K–8 science and had projects from three different suburban schools from grades 2, 4, 5, and 8. The software here was HyperStudio and spreadsheets.

## New Learning or New Knowledge Demonstrated in the Projects

The journal was created primarily to demonstrate the new types of assignments and activities that computers allow. First, they allow us to take on topics that were previously introduced only to upper-level classes using technology that is accessible to a lower-level class. An excellent example is one of the projects in the mathematics issue in which a 9th-grade algebra student used a spreadsheet to answer the question, "What is the maximum volume that can be created given certain conditions?" This question is a standard topic in a calculus class.

The journal also shows the new experience of learning that only technology can provide. For example in the computer graphics issue, an 8th-grade class was assigned to use two pictures—one a photograph of itself and the second a line art of some object—and generate a "morph" between the two. Another example was in the social studies issue in which an election across a large urban school district was conducted through a HyperStudio stack, with the results posted on a Web page. Both projects could not have been done before computers.

Finally, new assignments can explore new forms of reports, research papers, and autobiographical essays; poetry and creative writing where text, sound, and graphics are equally balanced; and comparative scientific observations (e.g., with a class in the Southern hemisphere to determine differing ideas of "daylight"). Also, what used to be a simple "Connect the Dots to Make a Shape" middle school math project suddenly expands into the new project "Translate Your Shape into Math Concepts and Animate Your Shape." All of these new possibilities allow for different types of learning.

A public audience is often an added factor in a project. For example, one school created a database of books to read. The template was designed by the grade-level staff and installed in all classroom computers. Students in each class entered reviews while moving through a classroom station. Classroom results were compiled at the end of a period so that each class ended up with a searchable grade-level file for book selections. The grade-level file is available at the library, and students will be encouraged to search the reviews when making their book selections.

Techniques for searching the database are presented at the library so that students can sort the file to find books with high ratings, particular authors, titles, or reviewers. Because this was a public access database, students who entered book reviews had to learn to write concisely and accurately.

The basic premise for each issue is to try to find those projects that use the computer in new ways to help students become actively involved in their own learning and become responsible for their own construction of knowledge. The computer allows for many different types of experience for the student, but NJECHO chooses those projects that support new ways of considering and renewing previous definitions of classroom activities.

## Reaction to the Journal

The journal is presented at of NJECC's monthly meeting. After the first couple of months, the computer coordinators began to report that they use the journal in two basic ways. First, they demonstrate it to teachers within their districts to disseminate the ideas about activities that teachers could bring into their classrooms. In this process, the technology threshold is lowered, because teachers realize that standard software is being used in these tangible and accessible projects.

Second, the journal is being used to demonstrate classroom projects to administrators with the idea that "we could do this also if (1) we had the equipment, (2) we had the software, and (3) we had the program." This latter is most important as schools move to implement curriculum-based computer use. Thus, the journal is being used as a tool to help foster and encourage not only curriculum-based use of the computer, but also the acquisition of both hardware and software that can help with different types of assignments and activities.

## The Journal's Future..

Starting next year, the projects from the previous year will be recorded on a CD and distributed freely to all participants at NJECC's yearly conference.

To make the distribution more widely available, NJECHO also now has a Web page on which selections from each monthly issue are displayed. In fact, the entire monthly issues can be downloaded. The Web address for NJECHO is:'

http://206.228.173.209/Class/
nj%20echo/njecho/contents.html

However, the address will change when a new server arrives. NJECC's address is:

http://www.nvnet.K12.nj.us/njecc/njeccpag.html

It will always link to *NJECHO.*

For further information about the journal, please contact Chris Kostenko, chrisk@nji.com.

*Beva Eastman, William Paterson College, Wayne, NJ 07470; in conjunction with the other members of the editorial committee—Eleanor Douglass, Mountain Lakes School District, NJ; Bernice Gedzelman, Woodcliff Lake School District, NJ; Chris Kostenko, Upper Saddle River School District, NJ; and Janis Lynch, Parsippany-Troy Hills School District, NJ.*

# *HyperStudio Garden: 101 Things to Grow*

**A Book Review**

*Kevin Andreyo*

HyperStudio Garden
Hofmeister | Rudowski

**Authors:** Joseph F. Hofmeister and Joyce B. Rudowski
**Copyright:** 1997
**Publisher and address:** ITP, An International Thomson Publishing Co., 7625 Empire Dr., Florence, KY 41042
**ISBN:** 0-538-65814-2
**Target audience:** Projects for children between ages 8 and 14
**Subject:** Projects using HyperStudio (Macintosh or Windows)

## Reviewer Background

I am the educational technology manager for an intermediate unit in Pennsylvania, an agency known in many states as an education service agency or ESA. My primary responsibility is providing inservice instruction to teachers on ways to integrate technology into their curricula. Multimedia is one such means available to accomplish technology integration. I am a firm advocate of the value of multimedia, having seen it used successfully at all grade levels. Furthermore, research shows that multimedia communication is proving to be an important ingredient in the overall learning process.

## HyperStudio

Often characterized as a beginning-level hypermedia application, HyperStudio is excellent for introducing students of every age to multimedia authoring. Like desktop-publishing applications, HyperStudio serves as a vehicle for creating reports, presentations, and projects that incorporate text, sound, graphics, and movies. Before students and educators can begin creating fantastic projects, however, they must learn the technical skills of using such an application. But once students and teachers have learned the fundamentals of the application, they can create wonderful projects that take full advantage of this multimedia-rich software.

## *HyperStudio Garden: 101 Things to Grow*

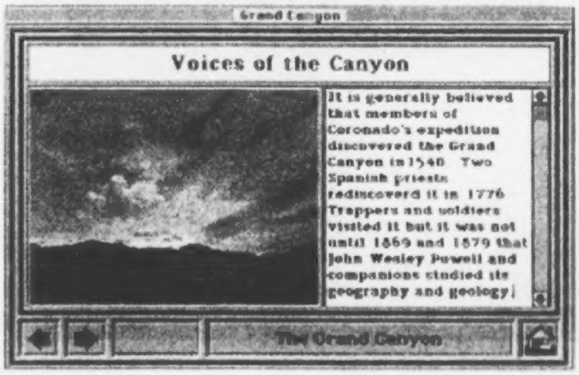
As a project manual, *HyperStudio Garden: 101 Things to Grow* provides 101 interesting projects that teachers can incorporate in their lesson plans. The projects described in this book are divided into six subject areas: science, language arts, foreign language, math, and arts and activities.

Each section begins with a project overview that concisely summarizes the projects. A section titled "What You Should Know About HyperStudio" will be useful to both novice and expert users of HyperStudio because it specifies the technical skills needed to accomplish each project; some merely require basic skills, while others require more advanced skills. The overview is followed by two pages of comprehensive instructions, including a step-by-step outline on project completion. Illustrations provide hints and sugjust the outline. In the text object, type statistics about the canyon, including the length, height, and width at several locations. Describe the depth, width, and flow of the Colorado River through the canyon.

**Step 4** Make a fourth card using the Ready Made Info Display choice. This card will have a close-up map of Arizona. Use the HyperStudio outline map of the United States, or scan a topographical map from an atlas. Use the brush tool to paint the colored layers of the Grand Canyon. Begin the deep somber colors at the base and the shades of buff, red, and slate gray that make the walls so distinctive. Draw the Colorado River as it winds through the canyon.

Type a description of the formation of the canyon. To do this you will want to find out about the layers of deposits and the kinds of rock that make up the area. Explain that while the river cut through the rocks to deepen the canyon, it was wind, rain, temperature, and chemical erosion that really made the canyon. Use the Blabbermouth NBA to make the computer read the description from the text object.

**Step 5** Make a fifth card using the Ready Made Info Display choice. Add the picture of the desert that is found on the HyperStudio CD-ROM. Type a short summary of the people who explored the Grand Canyon in the text object on the card. You may be able to find stories or poems about the canyon's grandeur. You may be able to interview people who have seen the canyon and can give you first-hand impressions. Include some of this information in the text object.



It is generally believed that members of Coronado's expedition discovered the Grand Canyon in 1540 Two Spanish priests rediscoverd it in 1776 Trappers and soldiers visited it but it was not until 1869 and 1879 that John Wesley Powell and companions studied its geography and geology

gestions for the finished work. The projects described cover a broad range of interests, and each has considerable merit.

The projects take on many forms including adventure games, digital reports, experimental instruments, database, simulation, instructional, and exploration. Some teachers and students will find many of the projects to be extremely useful as is or when modified to fit the educational objectives of the learner. Furthermore, some projects provide a flexible framework to create similar projects in other content areas. Below are some of the book's content-rich projects:

- Playing the Market: Simulates the ups and downs of investing in the stock market
- Four Strokes Does It All: Illustrates the classic moves of a four-cycle engine
- Name that Tune: Simulates the game of the same name
- Curtains for Hitler: Describes the events of D-Day
- The Tricky Triangle: Illustrates the uses of the triangle
- Why the Canyon Is Grand: Tells the story of the Grand Canyon
- What About Waves: Explores the science of an ocean wave
- Spanish 101: A short course in conversational Spanish
- Taking Speech Apart: Describes how words become parts of speech in a sentence
- Where's Marco: Builds an adventure game based on the life of explorer Marco Polo.

Many of these projects take full advantage of the media resources contained on the HyperStudio CD-ROM included with this book. This multimedia collection contains 240 background pictures, 140 QuickTime movies, 100 color button pictures, and 200 sound and music clips. HyperStudio also allows teachers and students to incorporate their own scanned images, digitized movies, and recorded sounds to add brilliance and substance to their projects.

## Recommendation

Use this book to assist in identifying HyperStudio projects of interest to your students and beneficial to your lesson plans. The book covers projects that can be done using HyperStudio for either Macintosh or Windows. A quick glance at the overview for each project will help you determine its most appropriate use. Use the projects as described or modify them to meet your educational objectives. However you use them, you will find this book to be an excellent resource in helping you integrate multimedia technology into your classroom.

*Kevin Andreyo is the educational technology services project manager for the Berks County Intermediate Unit, 1111 Commons Blvd., Reading, PA 19612; 610/987-8468; kevand@berksiu.k12.pa.us.*

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# *Critical Mass:* A Review

*by Ed Crowley*

**Year:** 1996
**Publisher:** Corbis, 15395 SE 30th Place, Suite 300, Bellevue, WA 98007; 206/641-4505; www.corbis.com
**Produced by:** Lisa C. Anderson
**Media:** CD-ROM
**Retail price:** $39.95
**Platform:** Windows 3.1X or 95
**Hardware:** Listed minimum requirements—486/33, 8 MB RAM, 256-color VGA graphics adapter, double-speed CD-ROM, 8-bit sound
**Classification:** Infotainment
**Domain:** Multidomain, including science, history, political science, and ecology
**Subject area:** Nuclear era; primary focus on the first atomic bomb project
**Age range:** 12 and up

*Critical Mass*, a Windows-based infotainment CD-ROM from Corbis, takes you back through the atomic era to its dawn. Whether you're a student of history, science, or sociology, this product has a learning experience for you. Students as young as high school freshmen, as well as their parents, will find *Critical Mass* an interesting and informative experience.

Through the lives of four scientists, *Critical Mass* presents the atomic era and its dawn in very human terms. With the explosion of the first atomic bomb, a nation could no longer build larger and more effective arsenals without consequences to itself. Now national boundaries and bigger arsenals no longer guarantee safety. Recent events—whether accidents such as Chernobyl or crimes such as the recent theft of Russian nuclear materials and their recovery in Germany—demonstrate this clearly.

## Program Description

From its central interface, *Critical Mass* offers five sections: "Features," "Biographies," "Timeline," "The Site," and "References."

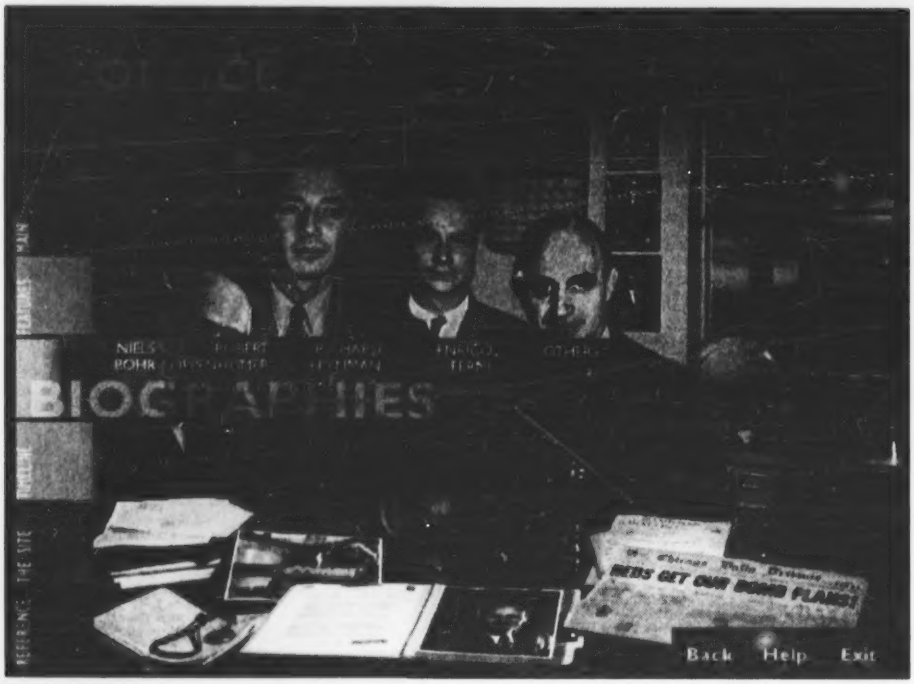
"Features" includes three components: the "Prelude," the "Los Alamos Story," and "Beyond Trinity." The "Prelude" and the "Los Alamos Story" have a linear multimedia tour structure. The latter recounts the transformation of a boy's school site into the atomic bomb project site.

CRITICAL
MASS

The interactive structure of "Beyond Trinity" enables you to assemble a multimedia slide show by choosing from among 200 photos of radiation treatment centers, nuclear reactors, Hiroshima peace memorials, and others, and by adding music.

The "Prelude," a chronology, begins in 1939, where it opens with Adolph Hitler and a narrative that explains that Nazi scientists have just announced their splitting of the atom. A newsreel-style presentation continues to show issues from 1940 through 1942, including the Holocaust; the Axis invasions of Poland, Russia, France, and North Africa; and the Japanese attack on Pearl Harbor. It then closes with the United States and Germany locked in a competition to develop the atomic bomb. "Prelude" concludes with a question: Would the Nazis or the Americans develop the bomb first? It leaves no doubt that the future of the world depends on the answer.

"Biographies" presents that answer using a storytelling style. Four young scientists, their development and their work developing the atomic bomb, become "Biographies" central metaphor. The scientists—Robert Oppenheimer, Niels Bohr, Enrico Fermi, and Richard Feynman—are introduced through a multimedia tour that includes each scientist's family, his birth, and his development as a scientist. Also included are relevant issues such as their studies and their mentors. This presents the scientists, and their times, in a



sympathetic, human manner. Their personal development seems metaphorical for the bomb's development.

Illustrated essays complement the tours and combine images and stories to depict other scientists such as Edward Teller, Lise Meitner, Leo Szilard, Hans Bethe, and Albert Einstein. Each scientist's illustrated essay also lists accomplishments.

"Timelines," the next major section, presents diverse atomic-era events. Here, multidimensional timelines chronicle interrelated developments in science, warfare technology, political history, and popular culture. The popular culture feature includes extracts from the first issues of both the Hulk and Spiderman comic books; each hero gained his extraordinary powers from an atomic accident. The scope of the timelines ranges from 30,000 B.C. to 1995. Warfare technologies extend from bows and arrows to smart missiles. All of that technology can be divided into before and after the atomic bomb project at Los Alamos.

The site for atomic bomb development was Los Alamos, New Mexico. Likewise, the program component called "The Site" is a virtual Los Alamos. Within it, you can turn 360 degrees and observe the campus as well as tour some of the more important buildings.

The final, three-part "References" includes an atomic atlas, an archives, and "Science Basics." The atomic atlas presents nuclear events both chronologically and geographically, including bomb detonations, accidents, and reactors.

The archive has many original documents, as well as film strips such as those depicting the destruction of the "Atomic Village." It also includes directions to the Trinity test site as well as the actual final instructions for assembling the bomb.

## The Interface

*Critical Mass*'s interface is elegant and well designed. Hyperlinking allows easy travel throughout the program. A central point-and-click interface called "The Office" lets users travel in any direction, and individual sections can be selected through various on-screen menus. Context-sensitive online help is also easily available.

The other method of navigating is to utilize the "hot" nature of "The Office." When the cursor moves over a hot area, it changes from an arrow to a hand. Clicking on a hot area launches a tour or similar component.

**Corbis was founded in 1989 to develop new ways to access and distribute images in digital form. The company is know for such award-winning titles as *A Passion for Art: Renoir, Cezanne, Matisse, and Dr. Barnes*. It also owns a 700,000-image digital archive.**

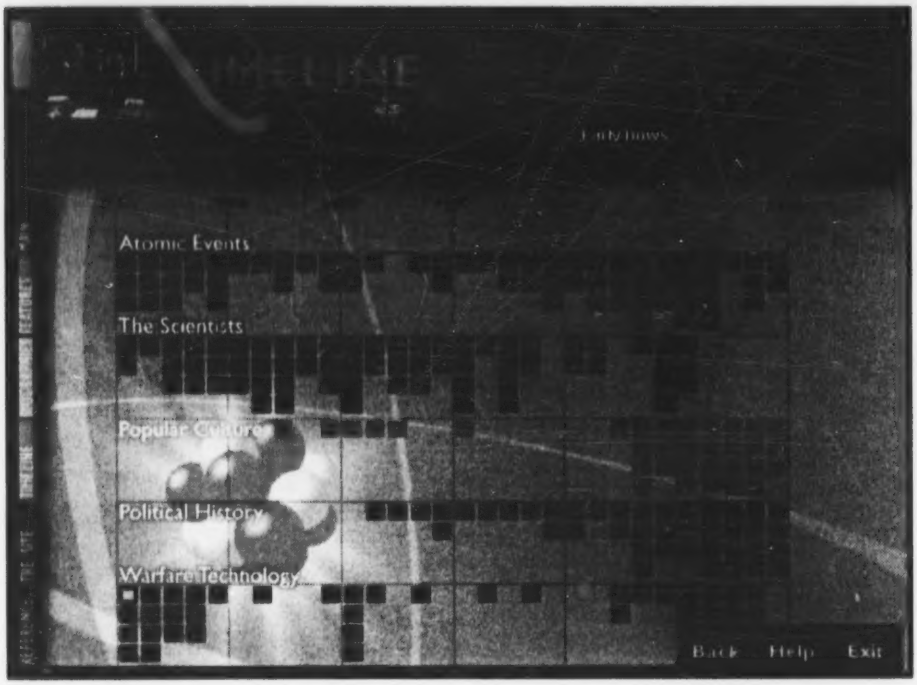
**Because so much of the archival material used in *Critical Mass* is black-and-white, using only 256 colors is not a major problem. However, because the interface only runs in the standard VGA (640×480) screen resolution, it presents itself as a window on a SVGA (800×600) screen. If you prefer to see a full-screen view, you can reset your computer to VGA mode.**

**Like many multimedia products, the minimum hardware requirements are optimistic. To view video sequences, you probably should have at least a Pentium-class processor with 16 MB RAM.**

## Documentation and Technical Information

*Critical Mass*'s structure and interactivity, in fact, are so intuitive that it doesn't require much printed documentation. In fact, the only print documentation is found in five paragraphs on the CD-ROM's inside jacket. The help function uses a demonstration style that shows how each feature works.

Installation is straightforward. Installations on several different machines produced only a single minor problem—and that was the result of Apple QuickTime routines rather than *Critical Mass* itself.



## Instructional Characteristics

Perhaps *Critical Mass*'s most outstanding characteristic is the stunningly effective way it uses different media to reinforce its information. For example, in "Science Basics," users can view several animations, including nuclear chain reactions and the fusion of uranium atoms. The intuitive interface also makes the program easy for novice students to master. It also transforms it, in McLuhan's terms, from a cold medium to a hot medium—that is, a medium that involves the learner.

Dual modalities—that is, multiple media—are frequently used to reinforce learning. For example, the audio presentation of the help utility reinforces what the learner sees demonstrated on the computer screen. Similarly, the scientists' biographies are presented in a multimedia slide show and again in a text- and graphics-based minitour.

While *Critical Mass* presents information in an outstanding manner, it lacks the testing, management, and feedback routines necessary for the program to be classified as a complete tutorial. But as others have observed, any computer program must be used with other materials to offer complete instruction. Consequently, this lack should not be viewed as a major drawback.

In a classroom situation, an instructor could use questions to provide guidance. These questions would focus instruction in a particular area. Historical, sociological, scientific, or cultural areas all are available. Also, the instructor could furnish testing and management functionality.

The "Beyond Trinity" section—in which you can build your own multimedia nuclear presentation—has the interactive feel of a game. This technique could also be incorporated into the classroom management.

**Via e-mail, I've asked Corbis about its plans to market ancillary materials such as teacher guides or student work books. Additional materials would substantially enhance this CD-ROM's classroom usability.**

**I've also put *Critical Mass* on the gift list for my nephews and nieces who are 12 years and older. I suspect their parents will find it just as informative and enjoyable.**

*Ed Crowley is a Ph.D. candidate in the information systems doctoral program at Nova Southeastern University. E-mail: crowleye@scis.nova.edu.*

# Letters

*Northeasterners believe that when it rains, it pours. However, Southeasterners know that scattered showers are likely. After a three-issue dry spell, we are pleased to publish two letters from readers.*

Dear HyperSIG Members,

The marriage of technology and creative arts is imminent and a big wedding is planned for the future. Of particular interest are the applications of technology in studio arts, theatrical drama, and music performance in schools, colleges, and universities.

This wedding is an assigned research project that I am conducting. Its culminating objective is the development of teaching/learning methods in which artistic participation in different areas of pursuit may be further enhanced by technology. I urge my fellow art educators to participate with me and to assist with the wedding preparations.

Stanley W. Wollock, Ph.D.
P. O. Box 2211, Wayne, NJ 07474-2211
fax: 1-201-595-3467
attention Stan Wollock, R404.

*Editor's Note: Stan raises a timely and significant issue. If you have ideas to share with him, write to the address above. If you have ideas to share with everyone, write to HyperNexus.*

Dear Trudy,

After reading the April issue of *HyperNexus*, I began to feel guilty about not submitting an idea for teachers to use with their students. Enclosed is a lesson plan that I have been using very successfully for the past three years with our fifth graders. . . . This was a very successful project, from the point of view of teachers and students. . . . Also enclosed are a few examples of student work. . . . I enjoy, especially, reading about ideas that are tried and true, classroom tested. . . . Keep up the good work!

Linda Aubry
Technology Specialist, St. Rose School,
Perrysburg, OH 43551
laubry@uoft)@.utoledo.edu

*Editor's Reply: Three cheers for a little guilt. Linda's classroom-tested work will be published in Volume 8, number 1. Stay tuned and spread the guilt around. Send us your classroom-tested projects. Many readers are waiting to read about them.*

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*HyperNexus: Journal of Hypermedia and Multimedia Studies* is the journal for the SIG. Published quarterly, *HyperNexus* brings together new ideas, new ways of thinking, and prominent voices in the area.

**Share your expertise!**

## Submission of Manuscripts

*HyperNexus* is published quarterly by the International Society for Technology in Education Special Interest Group for Hypermedia and Multimedia. *HyperNexus* seeks articles on K–12 and college instructional applications of hypermedia and multimedia in teacher presentation and student learning. Case study product reviews are welcome.

Two double-spaced hard copies of manuscripts with screen dumps and an ascii file (noting platform and wordprocessor used) should be sent by land mail. Include your name, address, phone, and e-mail address. Receipt of manuscripts will be acknowledged electronically.

Send manuscript package to the editor:
Dr. Trudy Abramson
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